A McGRAW-HILL PUBLICATION

Chemical Week

MARCH 19, 1960 Price 50 cents

Euromart cuts tariffs at speeded pace. Outlook for U.S. exports . . p. 21

Bulk chlorine by truck debuts in U.S. Pros and cons . . . . . p. 31

Waste disposal expert tells how to get more for money. . . . . p. 47

Drycleaning chemicals sales ready for do-it-yourself boost . . p. 105

How researchers 'sell'

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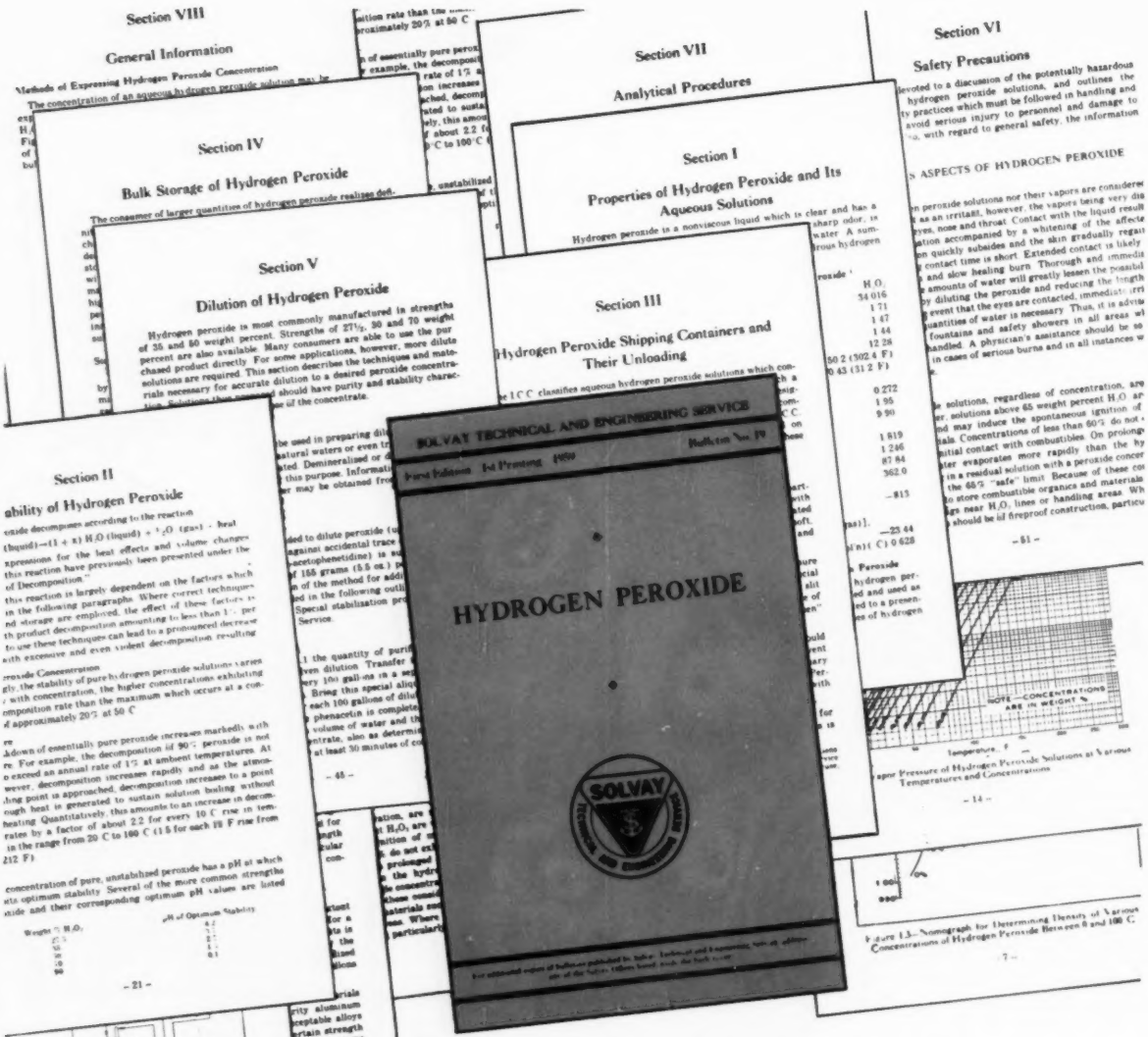
Section VIII
General Information
Section IV
Bulk Storage of Hydrogen Peroxide
Section V
Dilution of Hydrogen Peroxide
Hydrogen peroxide is most commonly manufactured in strengths of 35 and 50 weight percent. Strengths of 27½, 30 and 70 weight percent are also available. Many consumers are able to use the purchased product directly. For some applications, however, more dilute solutions are required. This section describes the techniques and materials necessary for accurate dilution to a desired peroxide concentration. Solutions should have purity and stability characteristics of the concentrate.
Section VII
Analytical Procedures
Section I
Properties of Hydrogen Peroxide and Its Aqueous Solutions
Hydrogen peroxide is a nonviscous liquid which is clear and has a
Section III
Hydrogen Peroxide Shipping Containers and Their Unloading
Section VI
Safety Precautions
Section II
ability of Hydrogen Peroxide
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HYDROGEN PEROXIDE
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NOTE — CONCENTRATIONS ARE IN WEIGHT %
Temperature, F
Vapor Pressure of Hydrogen Peroxide Solutions at Various Temperatures and Concentrations
Figure 5.2 – Hydrogen Peroxide Dilution System
PRIMARY MIXING TANK
DILUTE H2O2 STORAGE
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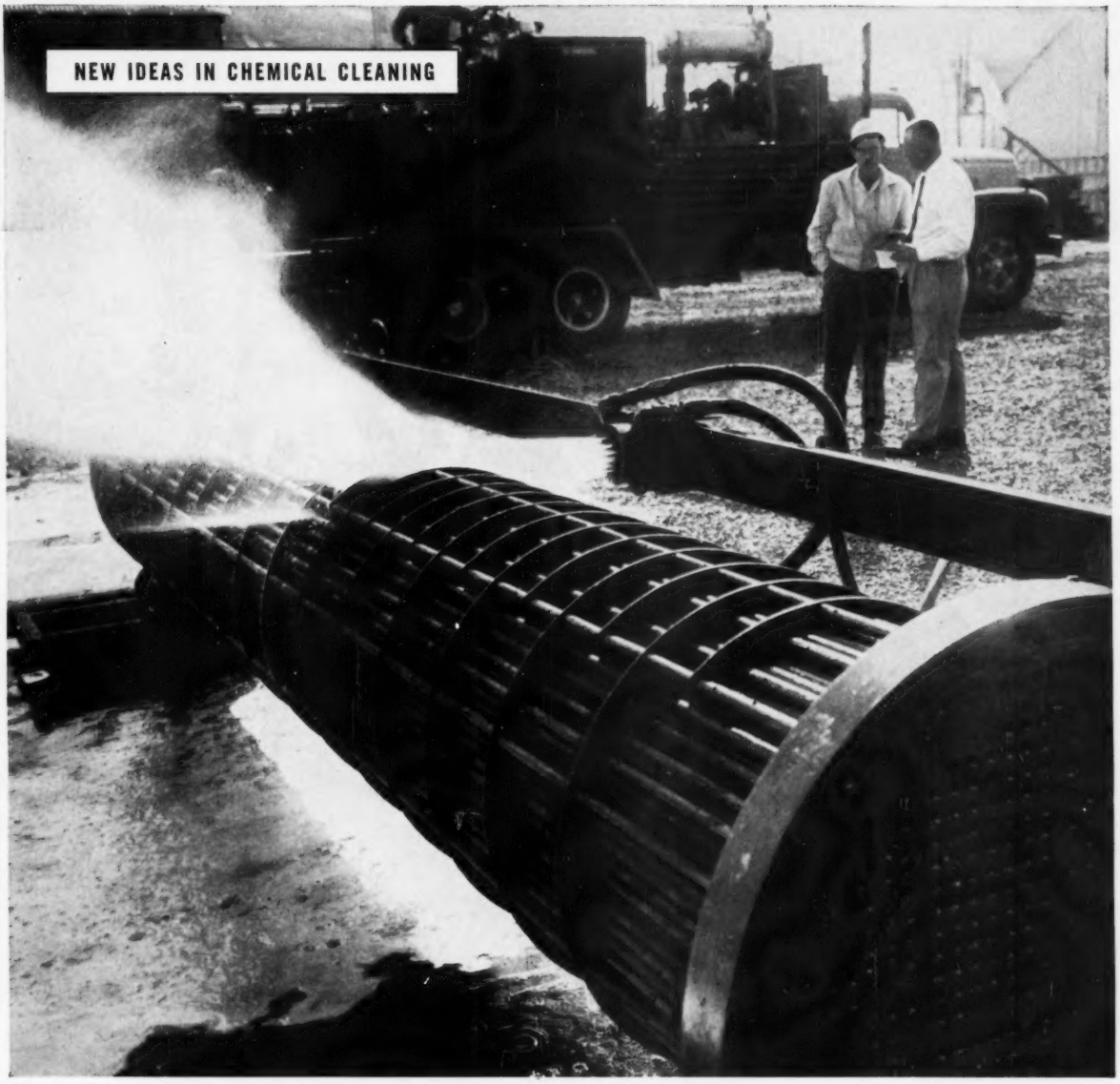


New Jetting Tool To Clean Tube Bundles Saves Thousands Of Dollars

The new high-pressure hydraulic tool, shown above, is currently saving thousands of dollars for companies in the refining, chemical, and petrochemical industries. It is the jetting tool developed by Dowell to remove deposits from heat exchanger tube bundles.

Previous methods of cleaning these bundles have been costly, time-consuming and often inadequate. Many times bundles had to be replaced completely because of the lack of a suitable cleaning method.

This new tool has a remarkable record of thorough, fast cleaning. For example, a slurry reboiler exchanger bundle, three feet in diameter and 16 feet long, was fouled with deposits of coke and asphalt. After being jetted from only one side, the bundle was thoroughly clean. Time required: less than one hour.

The tool holds the bundle in place for cleaning and has flanged rollers for rotation. The jet-head is manipulated automatically so that all tube spaces are covered. The jetted liquid can be either water or chemical solvents.

The new Dow Industrial Service Division will continue to offer the service which was formerly provided through the Dowell Division. For engineered recommendations to solve your cleaning problems contact the field office nearest you, or write Dow Industrial Service, 20575 Center Ridge Road, Cleveland 16, Ohio.

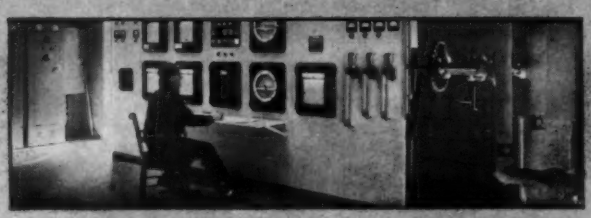
DOW INDUSTRIAL SERVICE

DIVISION OF THE DOW CHEMICAL COMPANY

DOW

On Stream

Dixon Chemical's Sulfuric Acid Sludge Regeneration Plant . . . Paulsboro, New Jersey



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Chemical Week

TOP OF THE WEEK **MARCH 19, 1960**

- **Chemical industry's capital expenditures to rise 33% in '60,** 12% more than "all industry" average .....**p. 55**
- **Acquainting public with hazards of handling chemicals** is objective of new medical association plan .....**p. 55**
- **Here's how journeymen-designers are easing** the engineering manpower squeeze caused by CPI's building boom ..**p. 65**
- **Hydrogen peroxide demand is gaining on capacity,** as basic users boost requirements .....**p. 93**

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Now is a good time for CPI management to make its position on many issues known to politicos.

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24 Phillips will boost ethylene capacity to 550 million lbs./year.

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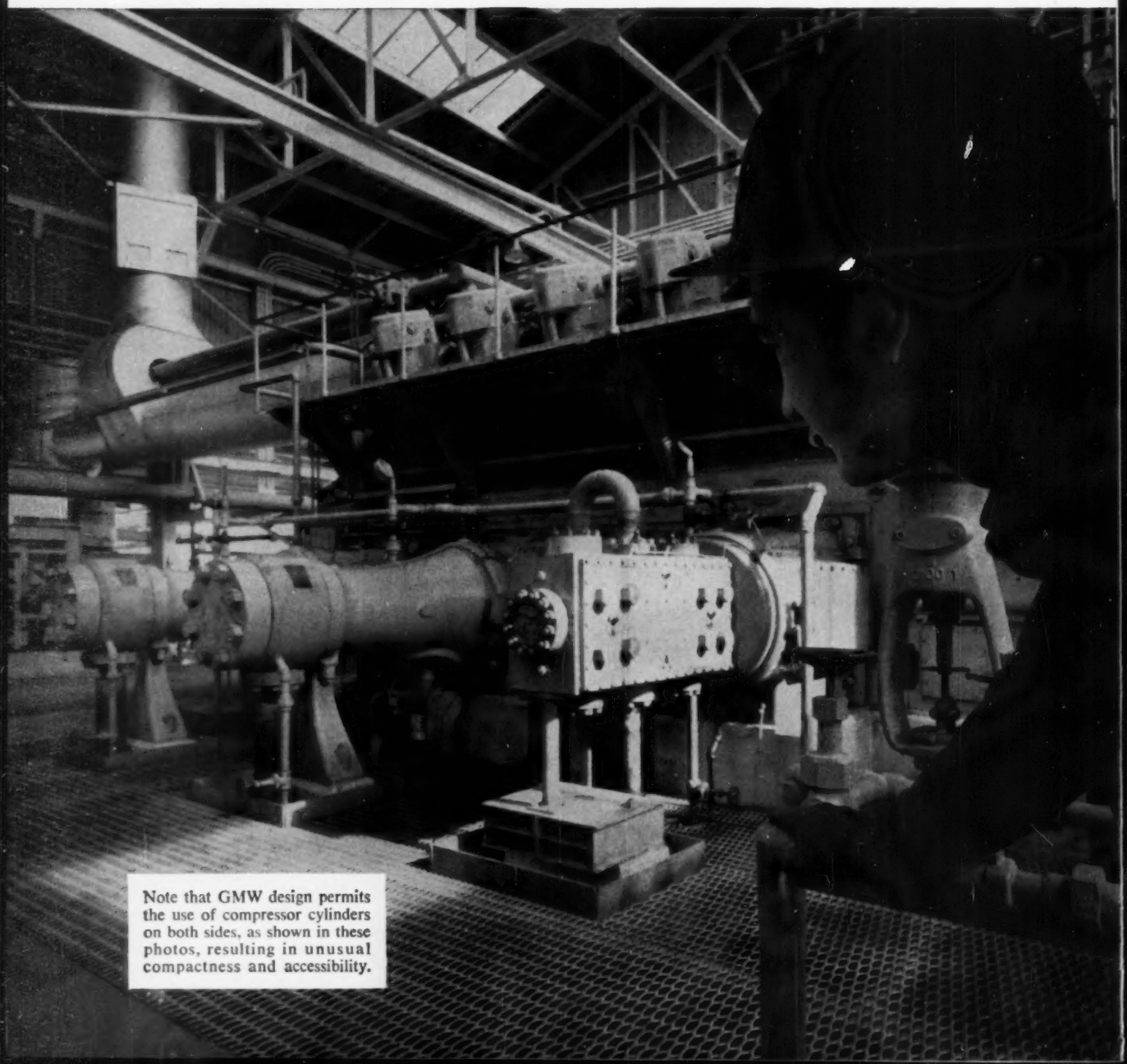
Report from American Cyanamid, Fortier Plant...

How Cooper-Bessemer gas engine boost synthesis gas for ammonia



Note that GMW design permits the use of compressor cylinders on both sides, as shown in these photos, resulting in unusual compactness and accessibility.

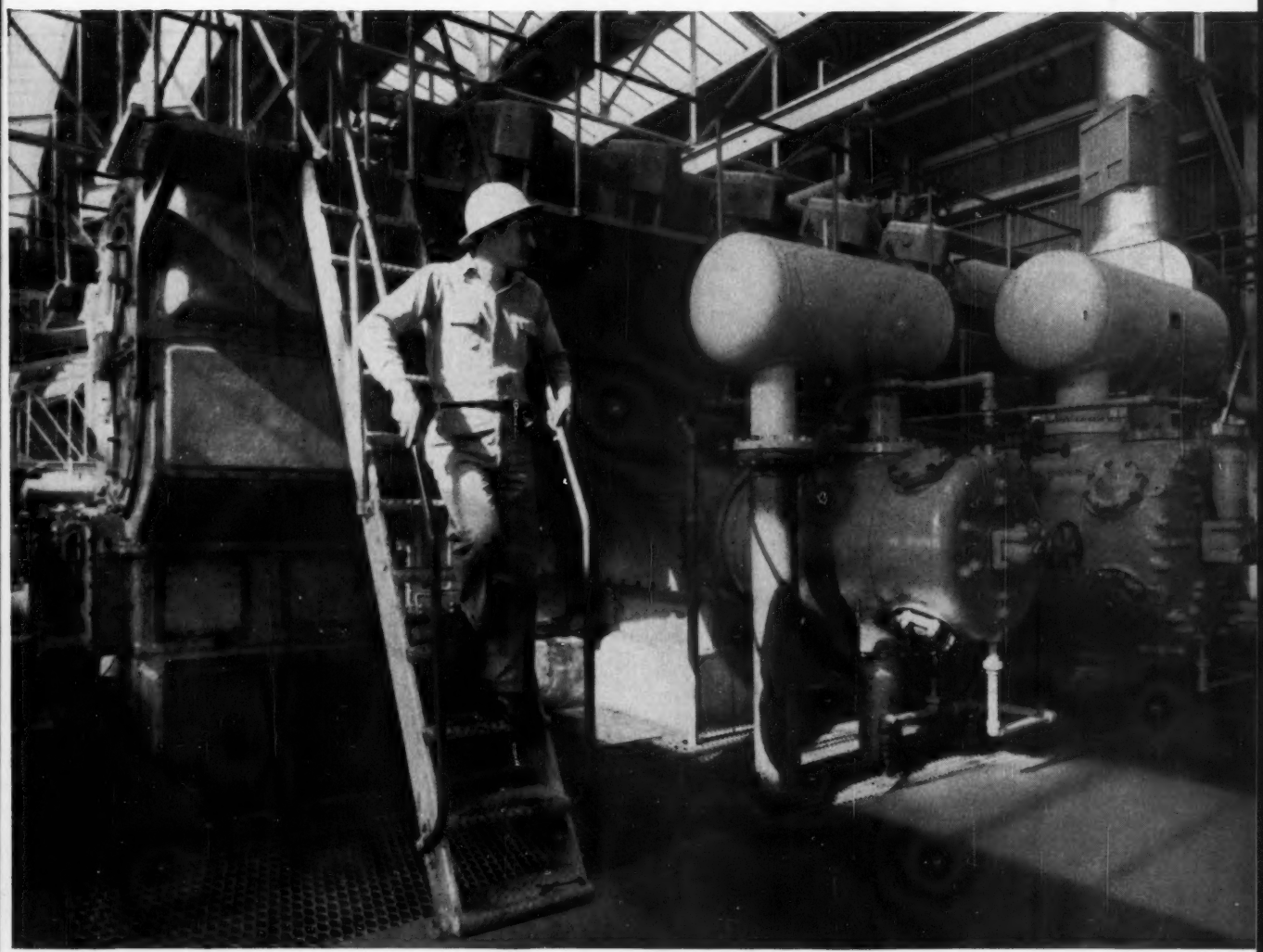
compressors to 5000 psi

These photos show both sides of one of the two Cooper-Bessemer 2500 hp GMW gas engine compressors at the Fortier Plant of American Cyanamid Company, Avondale, Louisiana. In the production of anhydrous ammonia, these 4-stage units compress 6000 cfm of synthesis gas from 60 psi to a discharge of 5000 psi. The left-hand view shows the high pressure cylinders; that on the right shows the low pressure side. The four stages of compression from 60 psi are (1) to 225 psi, (2) to 670 psi, (3) to 1500 psi, (4) to 5000 psi.

The two units have been operating since 1954, 24 hours a day, 340 days a year.

The anhydrous ammonia produced at the Fortier Plant is used by American Cyanamid in the manufacture of Acrylonitrile and is sold to fertilizer plants and other chemical companies.

Find out how Cooper-Bessemer can help *you* plan compression and power facilities. Write for copy of bulletin, "Cooper-Bessemer Equipment for Chemical Plants."



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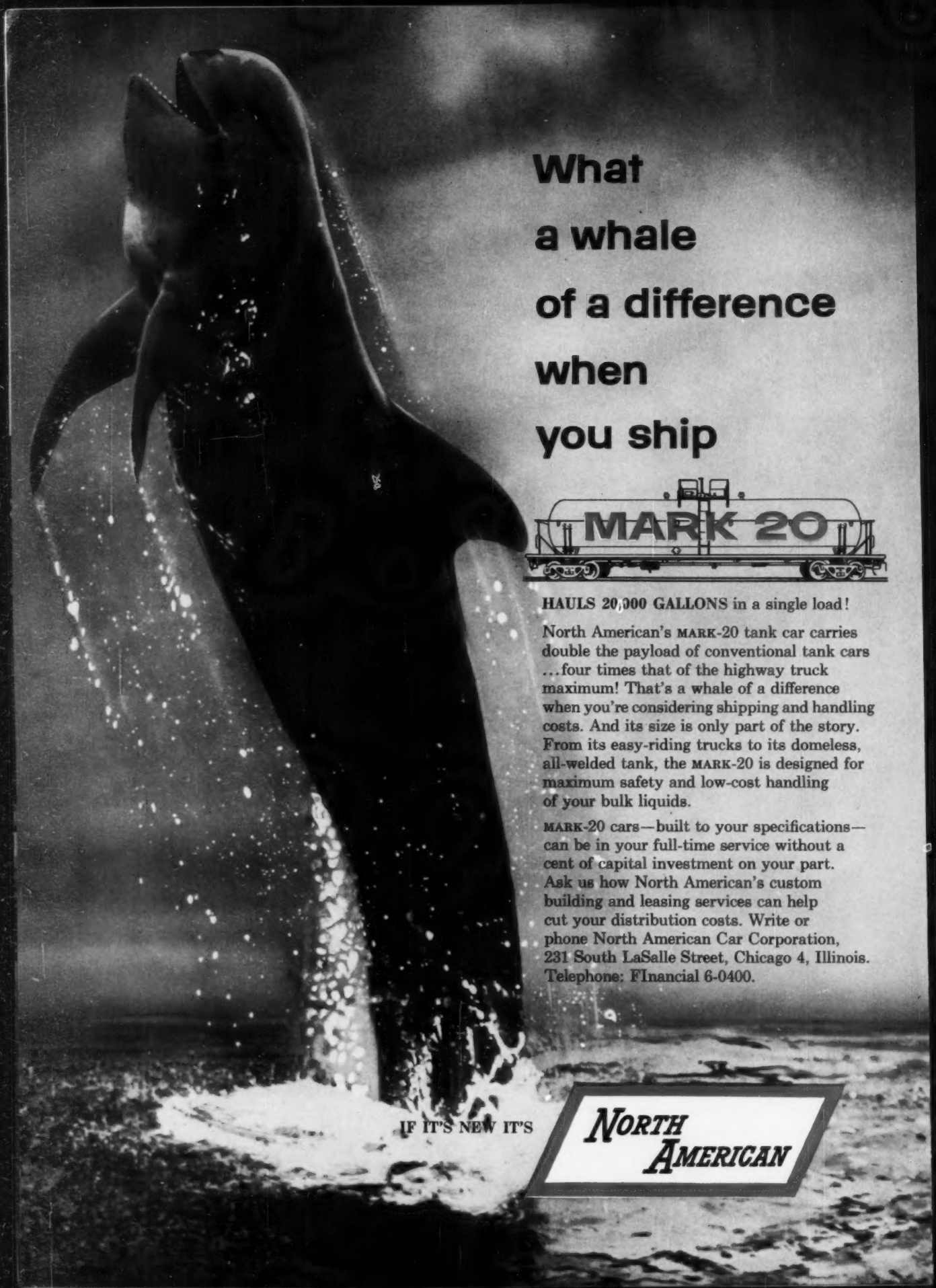
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LETTERS

Supply and Demand

TO THE EDITOR: Please don't mislead your readers when writing about the law of supply and demand *(CW, Feb. 6, p. 5)*. With few exceptions, the higher the price, the lower will be the quantity sold, and vice versa. This is sometimes called the "law of diminishing demand."

But please note: raising the price results in a lower total revenue only when the demand is elastic. With many drugs, the demand is undoubtedly inelastic. Because of this, it is possible for a drug company having a "monopoly" position on a certain drug to make great profits by jacking up the price. This is true even though the law of supply and demand is not being violated.

It is important that we examine from time to time the role our government plays in creating and protecting "monopolies." A truly competitive drug industry not only would better serve the public but also would discourage further government regulation of the industry.

SHELDON L. SUNDGREN
Richmond, Calif.

High-Purity Chemicals

TO THE EDITOR: We know you can't cover everything, but think you and your readers will want to know there is more to the preparative chromatography story than appeared in your Feb. 6 issue.

We have been producing and selling quantities of a few high-purity fatty acid derivatives since last fall, using a chromatograph as our major tool. Examples of compounds so made and sold in high degree of purity are methyl palmitoleate (our first chromatographic preparation), and the methyl esters of the relatively uncommon C_{15}, C_{17}, C_{19} fatty acids. These are really pure (99.9%). Our equipment is of larger diameter than the 1 in. mentioned in your article, is of our own design, although based on a Barber-Colman Wheelco unit, and is packed with our own special standardized succinate-ester Chromosorb packing.

Your article has one numerical error (the 92% methyl oleate). We offer and have sold for several years methyl oleate and oleic acid in 99%

VIEWPOINT

Tell Politicos What You Think

THE SWIFT RISE of political-action programs in CPI companies has been both astonishing and gratifying.

Astonishing because of management's inherent desire to avoid setting itself up, in the name of the corporation, as a possible political target; gratifying because it gives the corporate citizen—a voteless, but not voiceless, entity—a pregnant opportunity to exercise its manifold talents for a worthy cause: its own preservation as a potential creator of wealth.

We think management should grasp every opportunity to constructively underscore its attitudes, display its achievements, and exercise its voice in matters that affect it. Among the opportunities is that afforded by the new climate of interest in civic affairs and political action.

In the process industries such interest has shown itself in many programs. In general, they follow two routes: one, a completely impartial, hands-off, "let's get out the vote and encourage interest" movement; the other, a program that seeks to influence governmental actions.

These ambitious plans touch many bases, including such sophisticated practices as community surveys of business climate, and visits by plant management with state and U.S. congressmen to discuss specific issues.

The more modest plans usually limit themselves to putting employees through political-action courses designed to show them how they can participate in politics—such as that devised by the U.S. Chamber of Commerce.

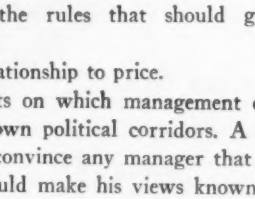
Response to such programs has been good, so far. Employees uniformly report new doors of interest open to them; businessmen have found that they can deal intelligently and face-to-face with politicians, if they do it reasonably and in a spirit of contribution. As for politicians, a number have said that personal talks with management have filled out areas of knowledge in which they were weak. Companies have reported that such visits have led to direct action.

It adds up, then, that chemical process management has much to gain in fostering its own growth on the political and civic scene (and, we caution, much to lose, if it moves heavy-handedly).

We urge overt action to enlighten political officeholders on industry's views, and we commend these topics as starters:

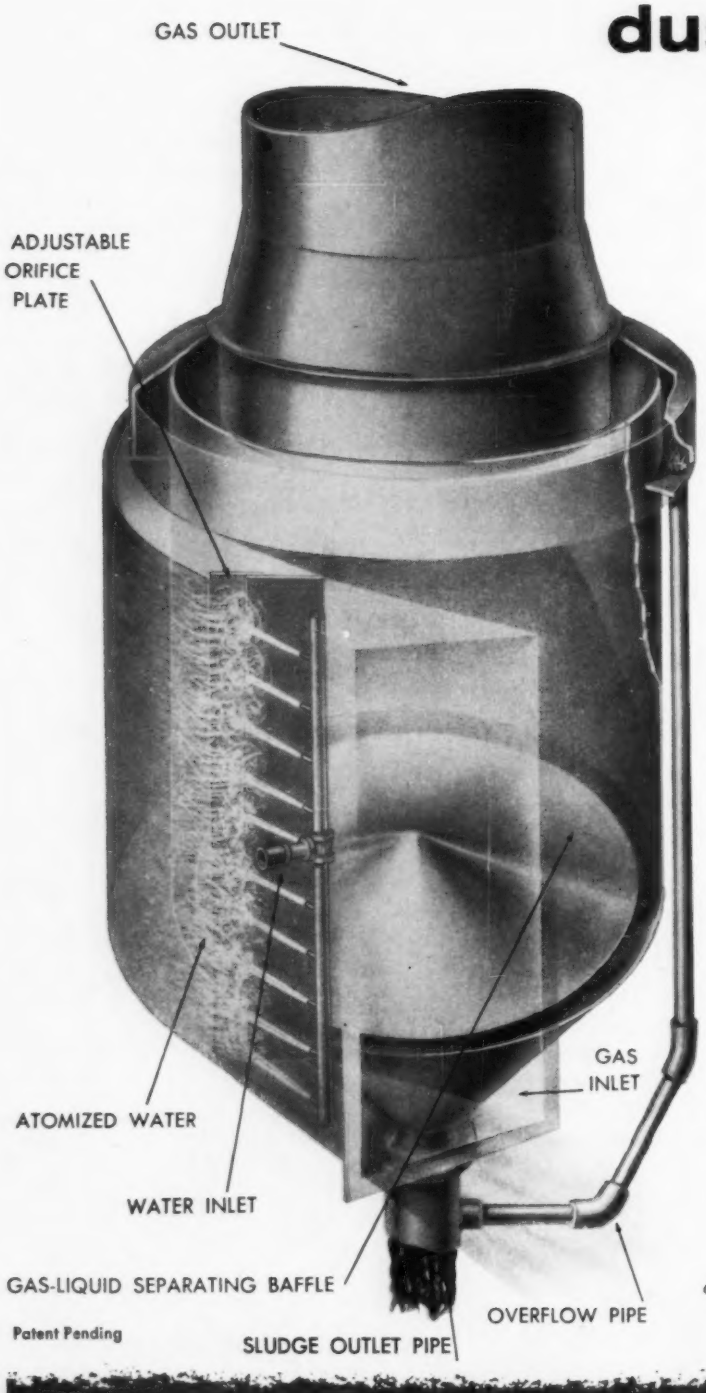
- Corporate taxation and its burdens on development, capital expansion, and capital attraction.
- International trade and the effects (both good and bad) of tariffs on overseas investments and domestic development.
- Local and regional business climates and how they influence decisions on sites for new plants.
- Labor-management issues, and the rules that should govern bargaining on them.
- The costs of business and their relationship to price.

These are only a few of the subjects on which management can—in fact, must—make its voice heard down political corridors. A quick review of the past year's news should convince any manager that there are many more issues on which he should make his views known.



Editor-in-Chief

a NEW scrubber for ultra-efficient dust and fume control



Patent Pending

THE DUCON *Oriclone* SCRUBBER

The Ducon Type VO Oriclone Scrubber—the only high energy scrubber with an adjustable orifice—is the most effective and most economical dust and fume collector for a wide range of industrial applications, including recovery of catalyst dust, cupola dust and fumes, acid mists, tar fog and many others.

The Oriclone Scrubber is a completely integrated unit that performs the entire separation cycle. No subsequent collector is needed.

Send today for detailed information on the newest concept in dust and fume control ... the Oriclone.

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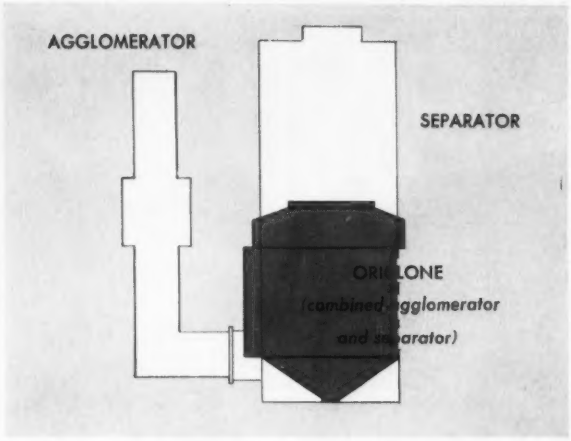
The Oriclone Scrubber uniquely combines high capacity and high efficiency with minimum space requirements. Here are some typical sizes:

10,000 CFM unit — Dia: 5'0" Height 6'0"
20,000 CFM unit — Dia: 7'0" Height 9'0"
30,000 CFM unit — Dia: 8'6" Height 12'0"

The illustration compares the size of a Ducon Oriclone Scrubber with another high energy scrubber of comparable capacity.



Comparison in size of Oriclone with other unit of equivalent capacity.

. . . FEATURES { small size / high efficiency / low cost

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- Economical in first cost and operating cost.
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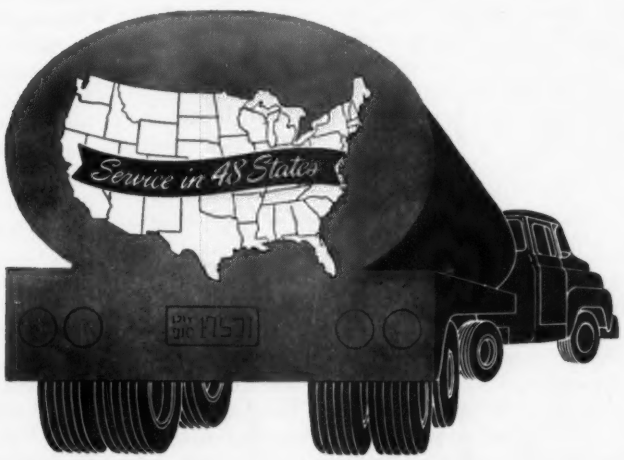

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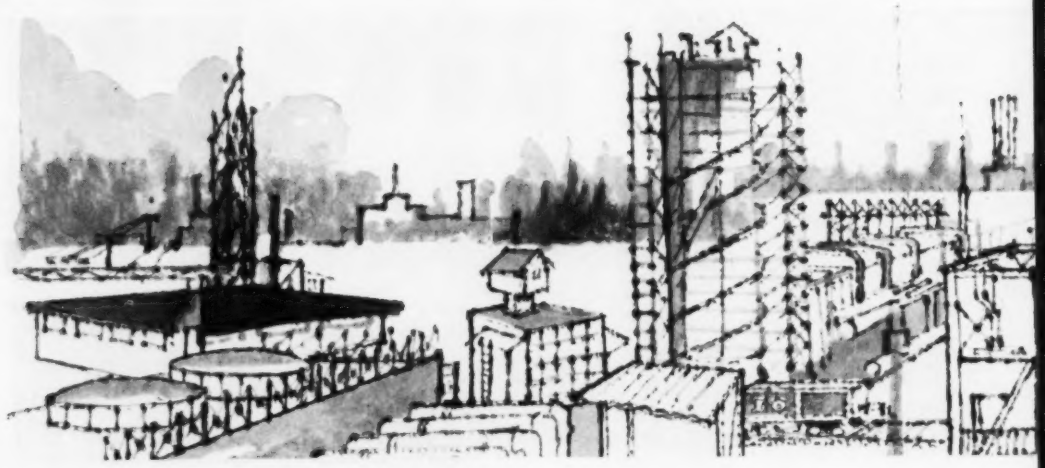


WHAT YOU SHOULD EXPECT

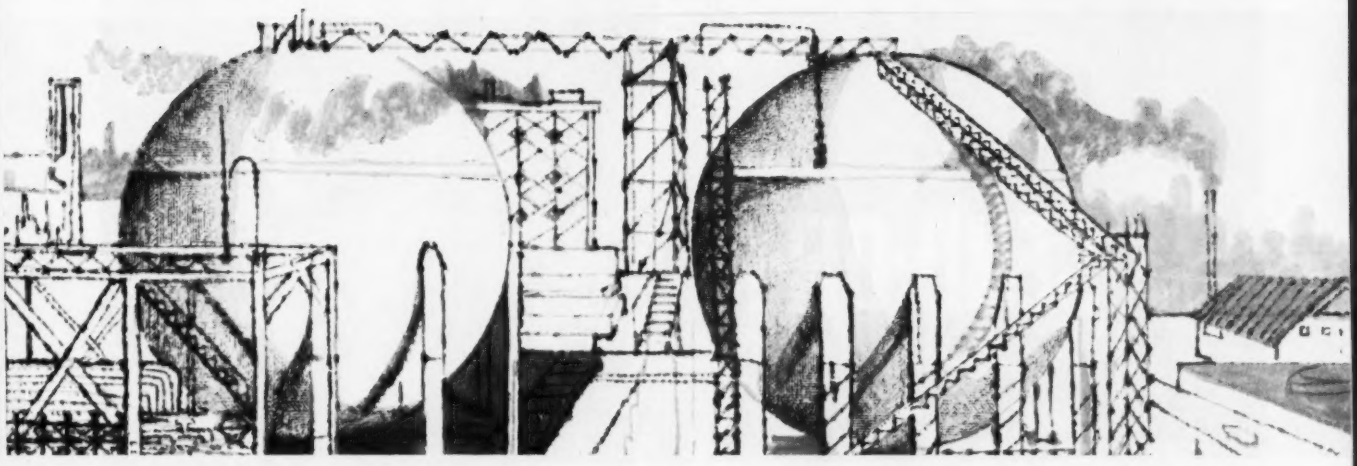
When you go to an engineering firm for help in the design and construction of a new plant, or the expansion of existing facilities, you have a right to expect certain basic standards from that firm. They should have EXPERIENCE, for only with past experience can you minimize the number of new problems which will arise on any new project. Such experience, however, should be tempered with FLEXIBILITY, CREATIVITY and VISION. Some companies are experienced beyond measure at building plants from designs more than 25 years old. In the highly competitive years ahead, such plants could prove economically unsound. You owe it to your company's future to select a firm which has proven its ability to provide the newest and the best in process engineering.

For almost half a century, CHEMICO has maintained a reputation for progressive and imaginative process design and improvement. This proven "know-how" is available to firms in the chemical and petrochemical fields requiring any and all types of engineering and construction services.

WAYS OF WORKING WITH THE CLIENT

A recently completed petrochemical plant offers the best example of the several ways in which CHEMICO is prepared to work with its clients. This huge complex was designed to produce acetylene derivatives, and included processes for producing a wide range of basic chemicals. The ammonia, sulfuric acid and ammonium sulfate sections of this plant were based on *Chemico's own proprietary processes.* The designs for the acrylonitrile and hydrogen cyanide units were based on processes developed in the *client's own pilot plant.* For the acetylene plant, CHEMICO *obtained a license* from BASF in Germany for their patented production-proven process. The oxygen plant was designed by the Linde Company of Germany on a *sub-contract basis.* CHEMICO's Construction Department was responsible for erection of all the plants, and CHEMICO's Industrial Projects Department supervised, coordinated and controlled the entire project.

CHEMICO is always prepared to provide its services to clients on any or all of the bases indicated above. For clients with processes of their own, CHEMICO's Industrial Projects Department will engineer and construct plants, starting at any stage of development. CHEMICO's own laboratories and pilot plant are available, if desired, for process development and improvement work on a contract research basis. If the process to be employed has already undergone pilot stage testing, CHEMICO will design the most economic and efficient commercial scale operation. In such a case, the client can be sure that CHEMICO will call on the services of outstanding engineers and technical personnel with experience similar, or related to the unit operations which are to be designed, engineered and constructed. In addition, the client can be assured that CHEMICO, as an independent engineering organization, will undertake such activities in the framework of a completely confidential relationship,



with all necessary safeguards for protecting the client's competitive position in regard to trade secrets and research developments.

In the case of clients who want plants to produce products for which neither CHEMICO nor the client has a process, CHEMICO, through its Industrial Projects Department, will obtain licenses from whatever source possible for production-proven process designs which will enable the engineering and construction of the desired plant.

Very often CHEMICO's drafting force as well as its specialists in civil engineering, mechanical engineering, electrical engineering and other service engineering capacities can be made available to clients on an individual contract basis. CHEMICO's construction organization, made up of a permanent force of highly experienced construction superintendents, is prepared to undertake a wide range of erection projects related to the process industries.

CONTRACT ARRANGEMENTS

CHEMICO offers its clients a wide choice in the type of contract under which each individual project is to be handled. Among the more common arrangements—although by no means the only ones available—are the following:

Cost Plus Fixed Fee: Under this type of contract, CHEMICO's fee and overhead charge for engineering, construction and related services is decided by mutual agreement, and the client is billed at direct cost for any and all expenses incurred by CHEMICO to complete the client's project.

Lump Sum: At the client's request, CHEMICO submits a firm estimate containing a specific price for which CHEMICO will undertake to complete the client's project.

Guaranteed Maximum: Under this type of contract, CHEMICO will set a maximum cost to the client for an individual project. If the cost of the project falls below the maximum figure, all savings will be divided between CHEMICO and the client on the basis of a prearranged rate.

Fixed Price Equipment Supply: Under this type of contract, the client gets the benefit of CHEMICO's design, engineering, purchasing and expediting services, but is free to make his own arrangements for the construction of his project.

Basic Design and Construction Supervision: This type of arrangement has proved extremely useful in dealing with clients outside the United States. Ordinarily, under a contract of this sort, CHEMICO provides the basic engineering for a project, and the client makes other arrangements for the detailed drawings and construction. CHEMICO then supervises construction and sees the project through start-up operations.

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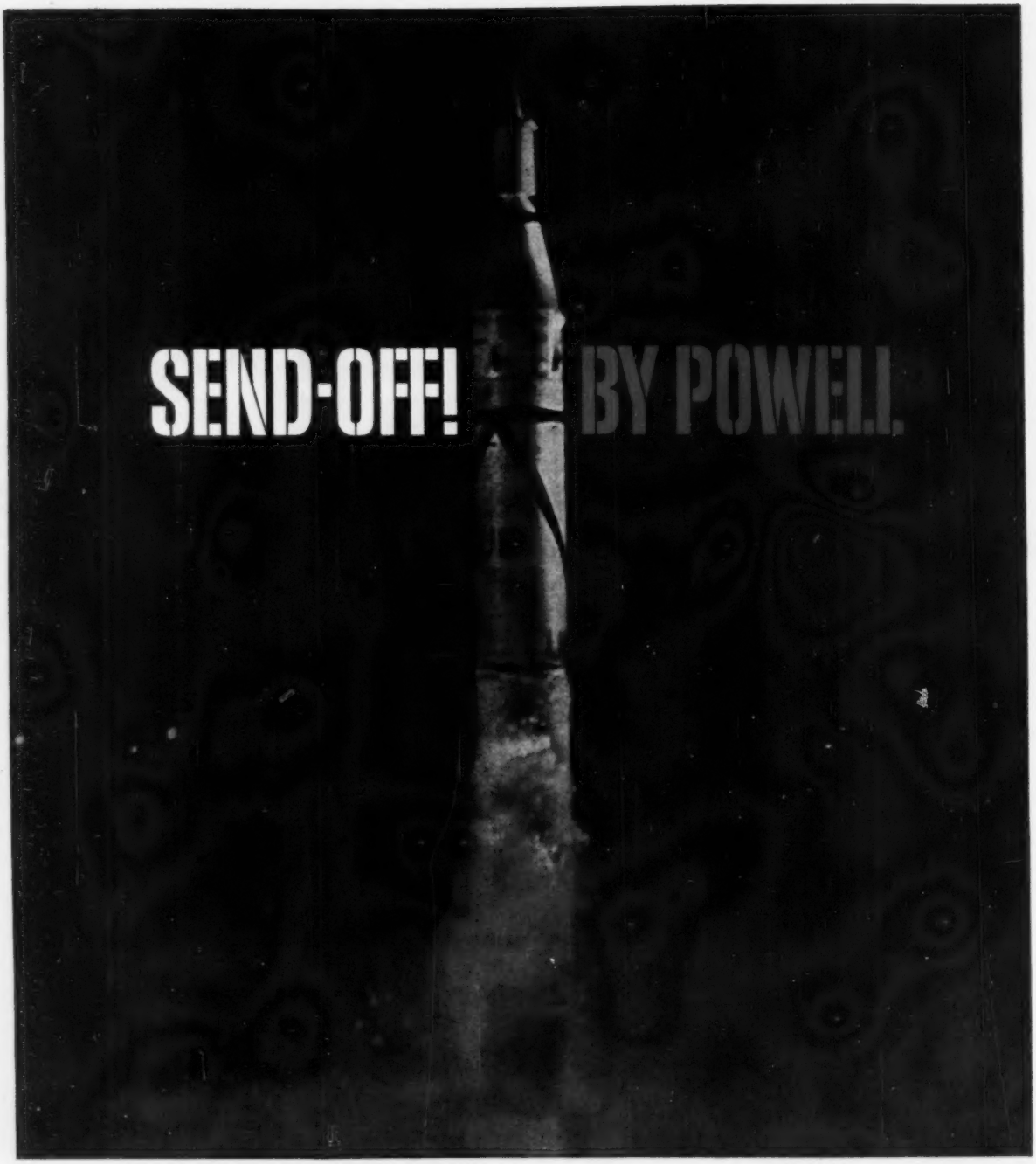

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THE BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

LETTERS

purity in kilogram or larger lots. We expect soon to offer methyl linoleate on somewhat the same basis. We can make these by chromatography but don't, since appropriate fancy crystallization, distillation and other procedures are cheaper than today's preparative chromatography for sizable quantities of these.

A big objective of our preparative chromatography is to make small quantities of various branched-chain fatty acids, and other odd-ball acids that occur in natural lipids and fascinate heart disease researchers, nutritionists, etc. No one should get the idea that we are talking tonnage quantities. Our most obstinate separation and purification products are quoted at so much per 100 mg.—just enough for the customer to see that he is getting something.

The purity achieved is mostly a matter of how much the customer wants to pay for extra effort. If we offer 97 and 99.8% grades at prices differing by a factor of five, practically everyone buys the 97%. The biggest bugaboo to this special high-purity work is that no one (including Uncle Samuel) has any money or real interest in long-term fundamental research . . .

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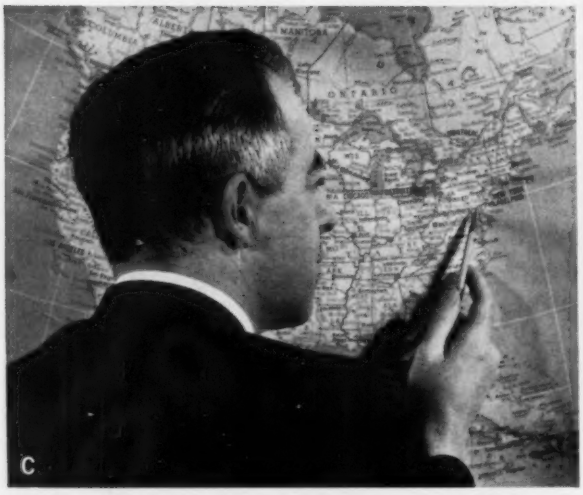
ARTHUR ROSE
Technical Director
Applied Science Laboratories, Inc.
State College, Pa.

No Morgantown Auction

TO THE EDITOR: As exclusive real estate brokers for the Morgantown Ordnance Plant at Morgantown, W. Va., we categorically deny the statement that "about 100 private bidders are expected to turn out when the $63-million Morgantown Ordnance Works goes on the block" (*CW, March 12, p. 30*). Moreover, the use of the term "on the block" is erroneous. The Morgantown plant will not be subject to auction.

H. H. ENGLANDER
Harry A. Taylor Co.
East Orange, N.J.

Reader Englander is right. As reported last fall, his company—aided by Singmaster & Breyer—has been retained by General Services Administration to negotiate the sale of this plant (CW, Nov. 14, '59, p. 119).



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Business
Newsletter

CHEMICAL WEEK
March 19, 1960

Monsanto continues to line up prospective plant sites. Its latest move: obtaining an option on a 3,000-acre Texas tract. This brings Monsanto's total options and acquisitions on parcels of land throughout the U.S. to 4,800 acres—all within the past six months.

Last week's deal covers a tract along the Chocolate Bayou, Brazoria County, about 25 miles from Monsanto's Texas City complex. Officials say the company holds a 60-day option with a 60-day renewal clause, is now evaluating the area's possibilities as a plant site. Spokesmen add, however, that no immediate construction plans are indicated by the real estate program. They term it merely an effort to cope with the intensifying shortage of good industrial sites.

Other parcels of land recently acquired: 700 acres purchased at Nitro, W. Va., and 350 acres of a 450-acre tract on which the company took an option at Oxnard, Calif. And the company still holds its option on 650 Gloucester County, New Jersey, acres. In all four states, the land is relatively close to present Monsanto plants; all four are on navigable waterways. (Chocolate Bayou is navigable by barge.) First hints of further land acquisitions this year came when Monsanto said that $16 million of its planned $113-million capital expenditure for '60 would be used to enlarge laboratories and offices at St. Louis, and possibly to acquire two more land sites *(CW Business Newsletter, Feb. 27).*

Meanwhile, the company's Plastics Division at Pittsfield, Mass., is putting up new bulk-loading facilities—part of a multimillion-dollar expansion and improvement program set for the division during the next five years. The program includes projects for process improvements, and laboratory and additional bulk-handling units to meet growing plastics demand, especially for polystyrene molding materials.

•

And Koppers is taking another step in its own expanding polystyrene operations. This company—whose Plastics Division sales rose 15% last year, to $49.8 million—is modifying and expanding its Kobuta, Pa., facility to permit a 15% increase in output of polystyrene molding materials by year's end. Earlier this year, Koppers set up a joint subsidiary with Sinclair Oil Corp. to build and operate a 70-million-lbs./year styrene monomer facility near Houston, Tex. (*CW, Feb. 13, p. 23*).

•

A 200,000-bbls. underground propane storage unit will be built by Continental Oil near Ponca City, Okla., the site of its planned cyclohexane facility. The cavern depot will cost nearly $1.4 million, is targeted for completion in early '61.

•

American Enka will expand its stake in nylon-6 for tire cord. Enka, which entered the nylon field in '54, has scheduled a 3-million-

lbs./year increase following startup this fall of its 3½-million-lbs./year facility for heavy-denier yarns. Up to now, the company has limited its nylon manufacture to fine-denier yarns for textile use. Latest expansion is set for '61 completion. Spokesmen say the new capacity is slated for applications in home furnishings and auto upholstery, as well as tire cord. (*Also see p. 99.*)

•

Allied Chemical will advance its position in fluorine chemicals. The company's General Chemical Division president, Frank French, this week outlined three planned steps:

• Expand anhydrous hydrofluoric acid facilities at Nitro, W. Va., by 50%. HF is used for producing both organic and inorganic fluorides.

• Acquire additional reserves of more than 1 million tons of fluorspar near San Luis Petosi, Mex.

• Authorize a plant at General Chemical's Baton Rouge center to manufacture a new group of fluorocarbon plastics. First product planned: a nonflammable molding and film thermoplastic based on chlorotrifluoroethylene. It's claimed to be highly resistant to heat and chemicals, and to have good electrical properties, low moisture absorption and high transparency.

•

Dow Chemical of Canada will start construction at its Fort Saskatchewan plant site. First step: a pentachlorophenol unit targeted for late '60 production. Facilities for ethylene oxide (by direct oxidation), ethylene glycols and ethanolamines are scheduled for late '61 startup. This plant once was considered as a site for a caustic-chlorine venture, but this project died following discovery of unsatisfactory brine reserves, a step-up of Western Chemicals, Ltd.'s caustic-chlorine production, and, more recently, the plans of Consolidated Mining and Smelting to build a British Columbia caustic-chlorine plant. A phenol plant for the site also lost out at that time; Dow of Canada decided to build it at Vancouver, instead.

•

Two more expansions this week:

• Hooker Chemical (Niagara Falls, N.Y.) has slated $6.4 million for a third phosphorus furnace at Columbia, Tenn., to be ready by third-quarter '61. This will add 20,000 tons/year to Hooker's present elemental phosphorus capacity; the firm has 45,000-tons/year capacity at Columbia and 6,000-tons/year at Niagara Falls.

• Columbia-Southern Chemical has begun construction of a $1-million ethylene dichloride plant at Lake Charles, La., scheduled for operation this fall. The new unit adjoins a C-S chlorine-caustic operation. It will be used for C-S's entry into ethylene-based chemicals, and is said to be the "first captive use of chlorine produced in the Lake Charles area." Petroleum Chemicals Inc. (Lake Charles) will supply the ethylene.

experience (eks pē'ri ens) n. Skill or wisdom gained by actually doing things. Knowledge gained by trial and practice. v.t. To undergo; to know or learn through one's own actions.

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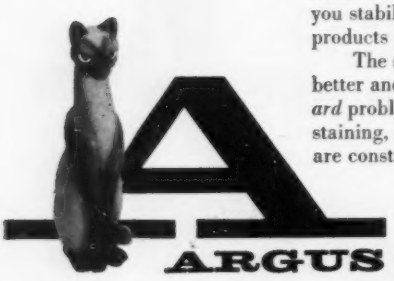

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Sizing Up 'Common Market' Tariff Shifts

	These were the tariffs U.S. exporters faced before the shifts started				These are EEC targets	Which may be cut to . . .
Product	*Benelux*	*France*	*Italy*	*W. Germany*	*All EEC*	*All EEC*
Phenol	free	25%	20%	free	**4%**	3.2%
Styrene	free	20%	9%	9%	**14%**	11.2%
Polystyrene	3-20%	30%	27%	11%	**20-23%**	16-18.4%
Polyethylene	3-20%	30%	27%	14%	**20-23%**	16-18.4%
Ethylene glycol	5%	30%	35%	11%	**19%**	15.2%
Titanium whites	free	25%	20%	3%	**15%**	12%
Synthetic rubber	free	free	free	free	**free**	free
Boric acid	free	15%	30%	4%	**8%**	6.4%
Butanol	free	23%	30%	14%[1]	**6%**[2]	4.8%

(1) Tertiary butanol free; (2) Tertiary butanol 8%.

U.S. Exports Spell Out Our Stake

(1959; million dollars)

Product	*Benelux*	*France*	*Italy*	*W. Germany*	*Total EEC*
Phenol	0.6	1.2	0.4	0.1	2.3
Styrene	4.2	—	0.3	0.04	4.5
Polystyrene	7.3	0.4	0.7	1.6	10.0
Polyethylene	15.7	2.3	6.1	6.3	30.4
Ethylene glycol	7.9	0.4	—	1.2	9.5
Titanium pigments	0.9	0.8	0.8	0.06	2.4
Synthetic rubber	13.2	28.1	8.6	16.2	66.2
Boric acid	1.8	2.1	0.7	3.7	8.3
Butanol	3.4	0.02	0.7	0.5	4.6

Putting New Yardstick on Euromart

U.S. chemical producers trying to keep track of the multiplying complexities of European trade relations ran into more confusion last week. But they also got a new yardstick that will help put the whole show in perspective. Latest developments:

• At a meeting in Brussels, the European Economic Community's Council of Ministers seemed to throw a damp towel on the mounting enthusiasm about speeding the development of the "Common Market."

• Outsiders got a good guide to where they stand when the long-awaited Common Market tariff list became available. It delineates the outer tariff wall U.S. exporters will have to scale, once EEC reaches its goal of a common "outside" tariff. It will be a valuable point of reference for U.S. exporters during the hectic moves and countermoves that are sure to come in the months ahead.

The basic economic aims of the six-nation Common Market still hold: to create an area with a common set of tariffs against outsiders, and with a completely free movement of goods,

capital and labor within. In essence, the plan is to proceed along two basic schedules.

Tariffs between members are to be reduced in stages, and quotas enlarged. The first 10% internal tariff cut was made Jan. 1, '59. At the same time, import quotas between members were enlarged by 20%. The second 10% tariff cut is due this July 1.

As a diplomatic (but not very significant) gesture toward their partners in the General Agreement on Tariffs and Trade, the six Euromart nations extended their first mutual 10% tariff cut to outsiders, except where this would have brought a tariff below the planned common level. This still has not been fully implemented, in part because the tariff schedule had to be drawn up first.

The second basic schedule calls for shifting of each member's outside tariffs toward the goal of a set of common tariffs. This is the list that was released last week (*top table, p. 21*). With some exceptions, the eventual tariffs will be the arithmetical average of the individual members' tariffs in '57. Certain "problem" items, such as synthetic rubber, boric acid, phenol and butanol, were negotiated on an individual basis on "List G," which was also released last week. Organics also got special treatment. Their tariffs are not averages. They are set at a maximum of 25%.

The first shift is not due until the end of '61. The members will raise or lower their tariffs by 30% of the gap between their tariffs in '57 and the planned common tariff. Where tariffs on individual items are already within 15% of the planned tariff, they will make the jump all at one time. This program is to be spread over 12 to 15 years.

Change of Heart: Over the past few months, pressure has been building up for accelerating the schedule. Businessmen were responsible for part of the push. Once they had dipped their toes into the strange waters of free trade, they decided it might be easier to take a plunge, rather than prolong the pains of adjustment. If you are going to expand your plant capacity for a vast new market, you can't easily do it in small stages.

Also, the feeling has grown that it would be easier to go through the difficult stages of the transition period while business was still booming, rather than wait five years, when the boom may have petered out. (Conversely, any sign of a leveling-off could scotch the plans during the next few months.)

There are other motives behind a speedup. The "Outer Seven" nations of the European Free Trade Assn. have timed their first 20% tariff cut among themselves for July 1—the date of EEC's second 10% cut. EFTA nations—afraid of losing the EEC market (which takes the bulk of their exports), yet unwilling or unable to enter EEC on its close-knit terms—propose that the two groups extend to each other and to other GATT nations their total 20% internal tariff cuts. Their ultimate aim: to dissolve the Common Market bloc into a looser Europe-wide free-trade area.

By stepping up their internal tariff cuts, EEC countries would upset these ambitions.

The Plan: Last fortnight, these considerations moved EEC's nine-man executive group to draw up a plan that could halve the time for full realization of the bloc's goals. This group's proposals:

- On July 1, lower internal tariffs by 20% instead of the planned 10%, and make another 20% cut on Dec. 31, '61. Including the first 10% reduction last year, this will have reduced their mutual tariffs by 50%, instead of the planned 30%.
- Speed up the first move toward a common external tariff by 18 months, to July 1.
- End all internal industrial quotas by the end of the year, instead of in stages over the entire transitional period.
- Free capital movements within the bloc.

To ease the sting for outsiders that would result from the stepped-up discrimination against them, the EEC commission proposed lowering by 20% the level of the eventual common tariffs, in return for immediate reciprocal tariff cuts by other GATT members, except by the U.S., which won't be able to cut tariffs until the GATT meeting this fall. Moreover, the commission posed the possibility of extending the internal 20% cut as a part of EEC's GATT bargaining, but not below the level of the unreduced external tariff.

Cold Water: The commission plan was the result of a compromise between the varying views of EEC members. Last week these national differences reared up at the meeting of the more nationalistic Council of Ministers, which must unanimously approve the commission's proposals before they can go into effect.

Contrary to published reports, the French did not veto the plan. But they did suggest that "reversion to the treaty would be best." They apparently agreed that if the July 1 internal tariff cuts are doubled to 20%, the external tariff adjustments would have to begin at the same time. But they won the support of the Germans in insisting that the 20% reduction of the common tariff goal be held out as a bargaining counter for GATT negotiations. The Dutch, on the other hand, want to reduce the external tariff before negotiating an additional internal cut. And Germany fears the inflationary effects of boosting its tariffs, which it will have to do when it moves toward the common tariff.

The ministers referred the plan to study committees. It will probably be altered, but it's far from dead. It will be very much in the air at the meeting of the 20 Atlantic nations in Paris at the end of this month. This is the meeting promoted by U.S. Under Secretary of State Douglas Dillon to help solve the basic economic problems of the West, including the split between Europe's two trade groups and the sagging U.S. balance of payments (*CW, Jan. 30, p. 27*).

Fathom-Deep Question: While everyone agrees the EEC commission's proposals are important, there isn't much agreement on what they all add up to for producers outside the Common Market.

One school of thought holds that a more rapid formation of the Common Market will speed up its economic growth, and that it will have to import more, not less, because of it. And these optimists point out that many tariffs will actually be falling, that, in fact, the average level for the market as a whole will drop.

But others are more pessimistic. They feel that it means a more rapid rise of discrimination.

One conclusion is that it isn't safe to generalize. The Common Market, with or without an acceleration, may

well absorb greater total imports. That doesn't mean foreign producers that now enjoy a market there won't get hurt.

The Benelux countries, for example, are now the biggest U.S. market for polyethylene and polystyrene, which have the same tariffs. But these countries' tariffs will be rising against U.S. imports while they fall away within the market, giving producers in the area an advantage over U.S. producers.

Right now, the Benelux tariff on polyethylene and polystyrene is 20% for outsiders, 18% for EEC members. (Outsiders couldn't benefit from the extension of the first 10% internal cut because the Benelux tariff was already below the eventual common level of 23%.) By the end of '61, the internal tariff would have dropped in two more 10% stages, to 14%. And the first adjustment of the external tariff would raise the outside level to 23%, since the gap between the original 20% national tariff and the 23% common tariff is less than 15% of the 23% rate.

Under the speedup plan, the internal tariff would be down to 14% next July 1, and 10% by the end of '61. Again, the rules wouldn't allow extending the first 20% cut to outsiders. And reducing the common external level by 20% would not be very significant. That would make the tariff to outsiders 18.4%—still well above the 10% internal tariff, even though it is less than the original 20%.

The liberalizing concessions would be only of limited value, even in cases of high-tariff countries like France. An outside polyethylene producer wouldn't get the benefit of an extension of the internal 20% cut on July 1 because it would bring the tariff below the level of the unreduced common tariff—23%. Result: by this July, the outside tariff would be 26.5%, compared with the internal tariff of 21%. And at the end of '61, the internal tariff would drop to 15%. The outside tariff probably would not be cut again until after '61—probably not before another internal cut—and it could go down only to the 18.4% floor.

Still, not all EEC imports will be cut off. The bloc is a long way from chemical self-sufficiency. Until it builds more capacity—and cuts costs—imports will continue.

New Speedup in Capital Spending

Expenditures for new plant and equipment, by industry. Dollar figures in millions. Source: U.S. Dept. of Commerce, Securities & Exchange Commission.

	1959 (actual)	1960 (planned)	Change
Chemical process industries:			
Chemicals and allied products	1,235	1,642	Up 33%
Paper and allied products	630	696	Up 10%
Products of petroleum and coal	2,491	2,930	Up 17%
Rubber and products	190	254	Up 34%
Nonferrous metals	313	372	Up 19%
Stone, clay and glass products	529	684	Up 29%
Total CPI	**5,388**	**6,578**	**Up 22%**
All manufacturing industries	12,067	15,132	Up 25%
Public utilities	5,667	6,066	Up 7%
Transportation	2,945	3,159	Up 7%
Mining	987	1,004	Up 2%
Communications, commercial, and others	10,877	11,655	Up 7%
All business	**32,543**	**37,016**	**Up 14%**

Capital Budgets Swell

Spearheaded by chemical and rubber companies, the process industries are significantly increasing their capital spending plans for this year (table, above).

For all U.S. business, '60 new-plant and equipment expenditures are now expected to be 14% higher than last year's—which would put this year's outlays on a par with the all-time peak attained in '57.

For makers of chemicals and allied products, actual capital expenditures were put at $318 million this quarter, $358 million next quarter.

These new figures on '60 investments—revealed last week by the U.S. Dept. of Commerce and the Securities & Exchange Commission—strongly reinforce two earlier indications of stepped-up spending this year:

Last fall, McGraw-Hill's Dept. of Economics found industry leaders planning a 10% rise in capital spending for '60; for producers of chemicals and allied products, the planned increase was 24% (*CW, Nov. 14, '59, p. 39*).

And several weeks ago, the latest Manufacturing Chemists' Assn. survey pointed to a 4.6% boost in "new

starts" of chemical plant projects this year (*CW Business Newsletter, March 5*).

This solid showing of business confidence is heartening to government and private economists. Business analysts say that—despite current skepticism in some quarters—they can now stick with their predictions of three months ago that gross national product would rise about 6.5% this year to $510 billion for the year as a whole.

Biggest single increase this year is scheduled by the iron and steel industry, which intends to boost last year's capital budget by 67%. This would bring the industry's spending to $1,728 million—slightly higher than the '57 peak.

The survey shows that manufacturers expect an over-all 8% increase in sales this year, compared with '59.

Boost for Benzoic

This week, Heyden Newport Chemical Co. (New York) underscored its optimism about the future for benzoic acid with plans to construct a 12-million-lbs./year unit at Garfield, N.J. The new plant will "far more than double the company's present production," company spokesmen say.

Total U.S. capacity now is only about 10 million lbs./year.

Heyden Newport will produce U.S.P.-grade sodium benzoate and both technical and U.S.P. grades of benzoic acid. The plant is expected to be onstream in the fourth quarter of this year. The company won't say what process will be used.

Sodium benzoate has been used for several years in food products at levels up to 0.1%, with Food and Drug Administration approval. Yet total U.S. sales of the technical grade amounted to less than 3 million lbs. last year.

What's behind the company's ambitious expansion project? The barring of some currently used food additives—not unlikely—could mean more demand for sodium benzoate. And a low enough price could spur the use of benzoate-type plasticizers in the vast vinyl tile market. These plasticizers contribute flexibility to vinyls containing substantial quantities of filler. But industry sources say the expansion "came out of the blue"; most had no clue that the company was planning a big expansion.

Expanding in Ethylene

A further whopping expansion of Phillips Chemical's ethylene facilities at Sweeny, Tex., is in the works. It will raise the plant's ethylene capacity by third quarter of '61 to 550-580 million lbs./year—tripling the firm's ethylene capacity since mid-'59.

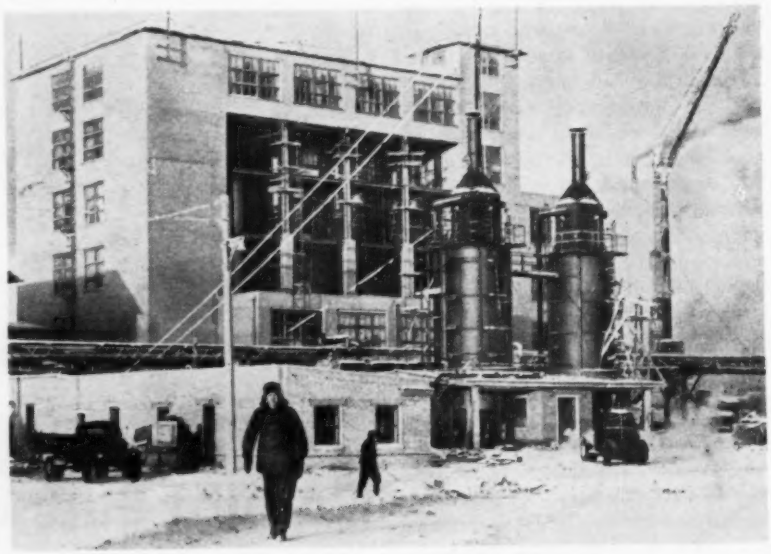
Already, one expansion is under way. During April 1960, the company said, ethylene production at Sweeny will be hiked to a 290-million-lbs./year rate. The latest plant, to be built adjacent to existing facilities, will virtually double this capacity.

The spate of Phillips' ethylene expansion began the end of June '59, when the company said it would add 75 million lbs./year to its 180-million-lbs./year facility on the Gulf Coast (*CW, July 4, '59, p. 23*).

Much of the output of the new facility already is contracted for, Phillips said. Its earlier expansions, according to trade sources, were to supply the explosively growing operations of Gulf Coast polyethylene makers on Phillips' 120-mile ethylene pipeline.

It's speculated that the further increase will be slated for the same customers, with Phillips supplying some new customers as well.

Principal customers are now U.S. Industrial Chemicals, division of National Distillers, at Houston; Celanese, at nearby Pasadena; and Union Carbide, at Seadrift. Trade sources add that one of the new contract holders might be Du Pont's upcoming Victoria plant. And a fair-sized share of the new output will be used captively for Phillips' Marlex linear polyethylene plant on the Houston Ship Channel at Pasadena.



Russia's German-Built DMT Plant

Due onstream late this month at Stalinogorsk, about 150 miles south of Moscow, is this dimethyl terephthalate plant built by West Germany's Krupp organization. It will be operated in step with two other Krupp-built plants also due onstream by month's end: one at Nowo-Kuibyschewsk, in the oil-producing region some 700 miles southeast of Moscow, to turn out *p*-xylene for the DMT plant; the other at Kusk, about 320 miles south of Moscow, to spin the DMT into fibers. An East German organization supplied the process and technical assistance for the Kusk plant; this is believed to be the first time that East and West German industrialists have worked together on a major manufacturing project. The three new plants—intended to produce enough synthetic fiber for blending into textiles to make up to 6 million suits per year—were planned and built in 45 months at a cost of about $13 million.

Rebuttal by Merck

Striking back at Senator Kefauver, Merck & Co. President John Connor is coupling a vigorous defense of the ethical-drug industry with his company's current public relations program.

One new weapon forged by Merck and brandished late last week for the first time: a survey of the U.S. ethical-drug market showing that the industry's 10 largest companies together accounted for no more than 53% of last year's identifiable sales at the retail and hospital pharmacy level.

This survey was sponsored by Merck as a rebuttal to Kefauver's recent charge that the industry was not truly competitive (*CW, March 5, p. 24*).

Lilly in the Lead: According to the new study, Eli Lilly & Co. is top drug house in sales, with 7.5% of the industry's total. Upjohn, Connor says, is close behind. Smith Kline & French is third; American Cyanamid's Lederle Division and Parke, Davis & Co. "are fighting for fourth place." Tied for sixth and seventh, with less than 5.5% each, are American Home Products' Wyeth Division and Merck. Next in line are Olin Mathieson's Squibb Division, Abbott Laboratories, and Pfizer.

And before a group of security analysts in San Francisco, Connor unveiled another statistic newly calculated for ammunition against Kefauver's subcommittee: "More than 80% of the prescriptions written for Merck products during the third quarter of '59 could not have been written 10 years ago; the drugs had not yet been born."

Ten-Year Edge over U.S.S.R.: But such a high rate of change and obsolescence is costly, he went on. While the Soviet Union may hold an edge over the U.S. in rocketry, "the Russians have allowed us to blank them out completely in the international competition for new drugs . . . because they did not want to foot the bill." The U.S. has now pulled so far ahead in pharmaceutical research, Connor asserted, "that it will take the Soviets more than 10 years and more than a billion dollars to close the gap."

The Merck executive told CHEMICAL WEEK he thinks Kefauver's apparent goals—some form of price control for prescription drugs, compulsory licensing of pharmaceutical patents, and use of drugs' generic names in prescriptions—are not in the cards. Reason: bills to accomplish those objectives would likely run into "a different attitude" in the standing committees of Congress that would have jurisdiction.

Connor does expect more vigilant policing of drug companies' advertising, but he foresees no significant change in pharmaceutical producers' policies on pricing, research and dividends.

Connor says he still looks for start of production of Merck's oral polio vaccine about next February, despite a "tremendous slowdown" in its testing timetable because of the cautious policy of the National Institutes of Health. Aside from mentioning a "toxiostat" now nearing the production phase, he declined to name any new products to be launched by Merck this year.

Cheer for Tehuantepec

Although one sulfur company has just pulled out of operations in Mexico, two other U.S.-owned concerns have new words of optimism this week for Mexico's future as a sulfur supplier to the world.

Sulphur Exploration Co. (Houston, Tex.) says it's continuing to prospect on its 23,000-acre concession, believes it has located workable deposits of 4.8 million tons of sulfur. Plant construction proposals are now being studied.

Company President George Mitchell predicts that Mexico's Isthmus of Tehuantepec will become the world's largest sulfur reserve area as U.S. Gulf Coast domes are depleted. Canada's sour-gas reserves, he adds, will then be the world's second-largest source of sulfur.

And Pan American Sulphur Co.'s Mexican subsidiary, Azufrera Panamericana, predicts that its shipments will increase by 9% this year to a record of about 900,000 tons. In January, shipments were 101,504 tons.

Pan American now is the only sulfur producer operating in Tehuantepec, since Texas Gulf Sulphur Co. (New York) shut down its Mexican operations several weeks ago (*CW Business Newsletter, Feb. 20*).

Stress on Organics

Diamond Alkali will step up its diversification into organics and plastics during the next few years, but not at the expense of its traditional lines of industrial inorganics.

Raymond Evans, chief executive of the Cleveland company, says that it hopes to introduce during the early '60s "at least one basic plastic material as well as several specialty resins and add several new chlorinated organics."

Soda ash, which at the end of World War II accounted for about 30% of the company's sales, now accounts for only 15%. Diamond's organics and plastics lines, on the other hand, have grown as sales-getters—from 2% to nearly 30%.

However, Diamond intends to hold its place in the inorganics field. It is heavily engaged in exploratory work on high-quality Wyoming trona reserves to determine the economics of producing soda ash from that mineral.

PVC, Chlorine: Evans told New York financial analysts that capital expenditures over the next two years of about $35 million will provide for additional polyvinyl chloride resin capacity, expansion of chlorine capacity, and a project to produce acetylene by partial oxidation of natural gas.

Evans said the company has been purchasing acetylene for PVC production, but that requirements have now reached the point where they would support captive output. In addition, said Evans, both acetylene and "off-gas" open "intriguing product possibilities."

New-product development is also slated for keener attention. The major portion of the company's $4-million research budget this year will go into product research. One study area: chlorinated xylenes, now in semicommercial pilot-plant production. First product of this group, in which the company hopes to establish a proprietary position, is Dacthal, the active ingredient of Swift's Rid, a new crabgrass control agent. The company's first patent in this field (U.S. 2,923,-634) was issued last month.

Diamond Alkali's sales in '59 amounted to $137.9 million, compared with $114.2 million in '58; net income climbed to $11.3 million in '59, compared with $6.5 million in '58.

COMPANIES

General Electric Co.'s Chemical Materials Dept. at Anaheim, Calif., is increasing concentration on manufacture and sale of phenolics and fused magnesium oxide, following sale of its alkyd and polyester resin plant to Oronite Chemical. Both phenolics and fused magnesium oxide are produced at Pittsfield, Mass.

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Eli Lilly & Co. (Indianapolis) has formed Elanco Products Co. to market products for agriculture, industry and home use. Elanco will operate as a Lilly division, headed by George L. Varnes, formerly executive director of the Lilly agricultural and industrial products division.

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Polymer Corp. (Sarnia, Ont.), a Canadian wartime synthetic rubber and chemical venture, will not be sold, despite a $75-million offer from Ventures Ltd. (Toronto, Ont.), a mining and industrial complex headed by J. D. Barrington, a former president of Polymer. During the past three years, Polymer Corp. is reported to have paid government dividends of $10 million on federal holdings of $30 million in capital stock.

•

Fiber Industries, Inc. (Shelby, N.C.), formed by Celanese Corp. (New York) and Imperial Chemical Industries (London) to produce polyester fibers, will make both staple and filament when the plant is completed. Production of its Fortrel staple is targeted for this spring; filament, within a year. The fiber is expected to reach the market by spring, '61.

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Permanent Filter Corp. (Los Angeles), which had planned to move its operations to a newly built plant at Oxnard, Calif., has now switched plans. The company will remain in the Los Angeles area, acquiring new property, and will sell the Oxnard facility. Reasons given: loss of key personnel, changes in manufacturing techniques and greater distance from suppliers if the move were made.

EXPANSION

Gypsum: American Gypsum Co. (Albuquerque, N.M.) has completed financial arrangements for a $3-million gypsum plant north of Albuquerque. The plant is said to be about the size of the new Kaiser Gypsum Co. plant nearing completion at Rosario, N.M., capacity of which will be 125 million sq.ft./year of gypsum building products. Kaiser—headquartered at Oakland, Calif.—also has plants going up at Jacksonville, Fla., and Houston, Tex. (*CW, Feb. 6, p. 22*).

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Germanium, Silicon Crystals: The Chemical and Metallurgical Division of Sylvania Electric Products, Inc. (New York) is expanding its Towanda, Pa., facilities for production of single-crystal germanium and silicon for the semiconductor industry. The $500,000 expansion will be in operation within 90 days. New equipment will include units for producing germanium single crystals by vertical and horizontal methods, and silicon single crystals by vertical- and float-zoning.

•

Aluminum Chloride: Allied Chemical Canada plans to break ground soon for its anhydrous aluminum chloride plant. A southwestern Ontario site is expected to be selected this month—probably at Sarnia. Capacity and costs were not disclosed, but engineering plans reportedly have been completed. Allied Chemical is a major Canadian supplier of this catalyst, used in manufacture of petrochemical products.

•

Textile Chemicals: Texize Chemicals, Inc. (Greenville, N.C.), is doubling capacity of its plant, the third expansion of the company within 18 months. Two new wings will be built by Daniel Construction Co.

FOREIGN

Polypropylene/Japan: Mitsui Chemical has won the race for clearance to produce polypropylene in Japan. It's now licensed by both the government's Ministry of Trade and Industry and by Montecatini. Construction of a $9-million plant will begin immediately at Otake near Hiroshima; startup is slated for late '61. Planned capacity: molding resin, 5 million lbs./year; fiber resin, 5 million lbs./year.

•

Chemicals/Australia: C.S.R.C.-Dow Pty. Ltd. (Altona) will spend $3.4 million for expansion. The company, jointly owned by Dow Chemical International and Sydney-based C.S.R. Chemicals Pty. Ltd., produces styrene monomer for C.S.R. Chemicals Pty. Ltd. and Australian Synthetic Rubber Co., and will soon also make ethylene dichloride, caustic soda and chlorine. Major ethylene dichloride customer: B. F. Goodrich, for use in PVC resins.

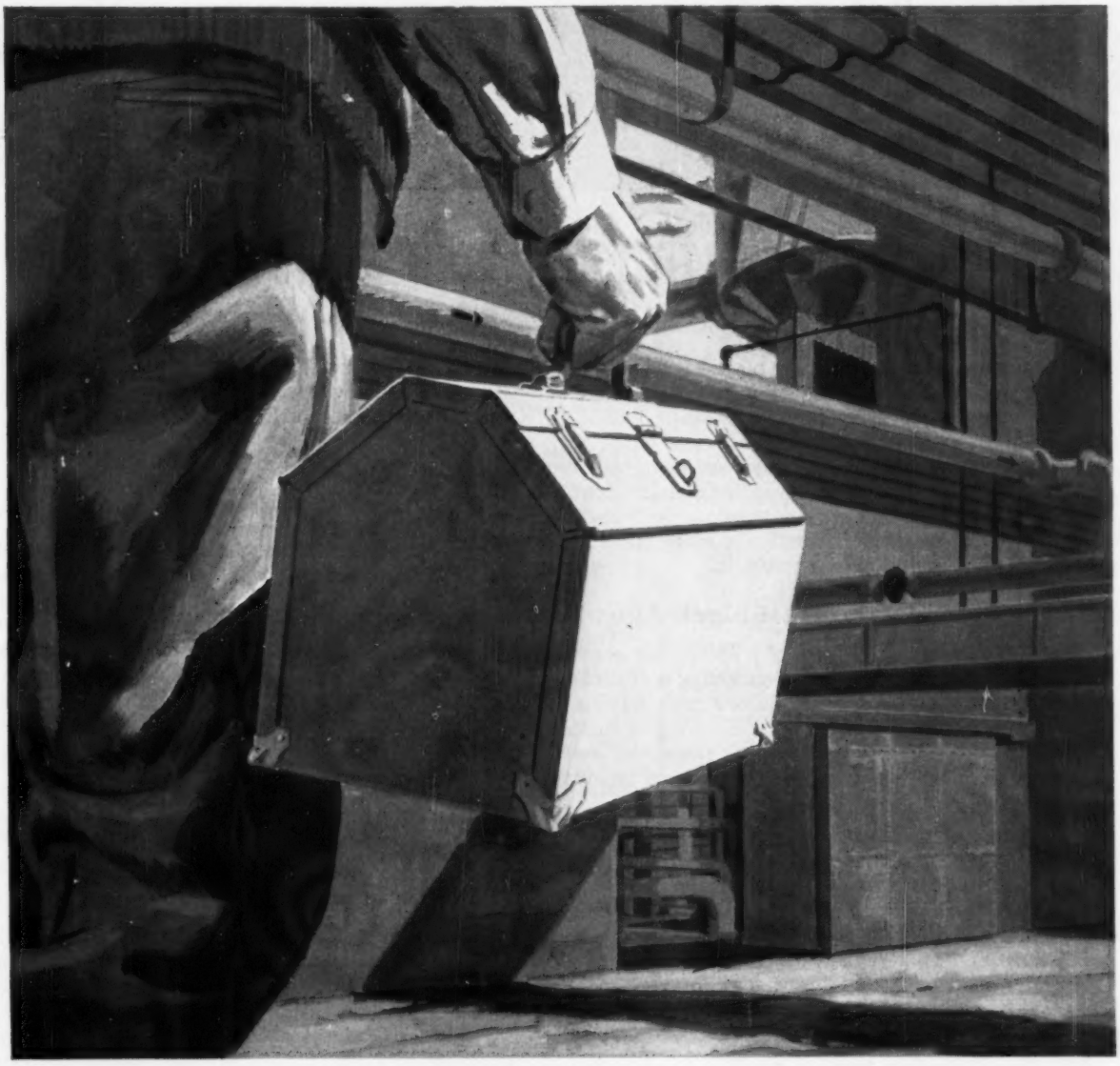
•

Sales Reports/France: Three French chemical companies have reported sales for '59: St. Gobain, $181.8 million in chemicals and glass, with exports amounting to $12.12 million; Pechiney, $152.37 million (including sales tax monies to be turned over to the government), with aluminum accounting for $85.98 million, chemicals $66.39 million, exports $50.57 million; Rhone-Poulenc and subsidiaries Specia and Prolabo, $170.69 million (including sales taxes).

•

Pharmaceuticals/Mexico: Allied Laboratories, Inc. (Indianapolis) has purchased Establecimientos Francimex, S.A. (Mexico City), which will produce and sell Allied Laboratories' Pitman-Moore Division products.

ALLIS-CHALMERS



This maintenance man's toolbox sums up the story of

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Even the standard products Allis-Chalmers builds for chemical processing are designed for the industry's special requirements . . . and designed so routine inspection and maintenance are simply, quickly done.

And from no other manufacturer can you match the range of equipment available and benefit from Allis-Chalmers unit responsibility. Listed at right are some of the Allis-Chalmers products built to serve you economically throughout the plant — from raw material to finished product.

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A-C products for chemicals: Electrical Generation and Distribution Equipment; Pumps, Motors, Control, Valves, Dielectric Heaters, Rectifiers; Processing Machinery (mills, screens, kilns); Water Conditioning Systems, plus Material Handling Equipment. A-1268

Chemicals from Armour for the plastics

Manufacturers of plastics and plastic products frequently are faced with production problems such as poor mold release, blocking, electro-static build-up on surfaces and inadequate dispersion of pigments. These problems and many others are being solved through the use of Armour Aliphatic Organic Chemicals. The cost and time-savings these versatile chemicals effect are worth the attention of every manufacturer of plastics and plastic products.

Mold Release and Anti-block Agents

When improper mold release of polyethylene occurs it necessitates costly and time-consuming operations. Two examples of 'extra' operations are, between-cycle release sprays and frequent cleaning of molds and extrusion dies. Poor anti-block properties lead to storage difficulties with stacked film and molded products.

Armour's Armid® chemicals (Aliphatic Amides) act effectively in solving these problems. The Armids migrate to the surface of the polymer film and act as slip or release agents during both extrusion and storage. In most cases only as little as 0.05% of chemical is necessary. Polyethylene films modified with an Armid chemical can easily be used in high-speed packaging operations. In addition, polyethylene molding equipment will cycle faster, less time is spent cleaning molds, and there is no need for between-cycle sprays. The anti-block properties are passed on to the finished products so there are no stacking or nesting problems while in storage.

Armids for plastic film for food packaging—Makers of plastic film for food packaging should be particularly interested in the use of Armid HT (Stearamide) and Armid O (Oleamide). Both of these Armour chemicals are listed as acceptable by the Food & Drug Administration for use in the food packaging field.

Anti-Static Agents

Vinyl—Electro-static build-up in vinyl products is a common and annoying problem. Production costs may be unnecessarily high because slip sheeting or other special handling during production and shipment is needed, and severe arcing may occur during calendering operations. In addition, the finished product will still retain the static charge, causing new problems for the user—unsightly dust collections on display items, annoying shocks built up on automobile seat covers.

Surface treatment of the plastic or vinyl has been used to prevent electro-static build-up, but this method of treatment introduces a new set of difficulties—limited protection time and water spotting (an extra operation if buffing is required after drying).

Search for a better method of eliminating static led Armour to investigate the incorporation of an internal anti-static agent. At present, Armour's Ethofat® C/25 and 60/15 and Ethoquad® C/12 are being incorporated into vinyl formulations. These polyethoxylated chemicals not only eliminate the production and shipping problems involved, but provide the anti-static property to the finished product.

Makers of pigmented plastics will be especially interested in recent work with Armour's aliphatic-organic coated pigments. When coated pigments are incorporated into polyvinyl chloride plastisols they impart internal anti-static properties to the fused sheet.

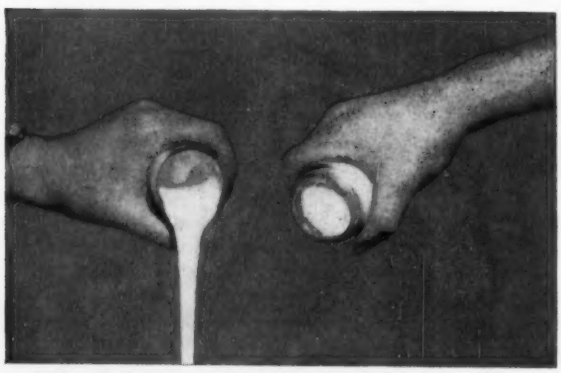
Fiber-glass—When producing resin fiber-glass structures, such as boats or chairs, a mixture of glass rovings and resin is sprayed onto a mold. As the rovings are delivered to the chopping head an electro-static charge is developed that causes the rovings to migrate to the nearest source of an opposite charge, the metallic spray-gun.

industry

To overcome this problem, a water solution of Arquad® 12-50 (quaternary ammonium chloride) is used to coat the glass rovings, before they are used in the spray-gun. Work stoppages to clean clogged nozzles are cut sharply and it has been reported that there is an actual increase in the bonding strength of the resins to the glass.

Pigment Dispersants

Manufacturers of plastisols and other plastics that require pigments should take note of Armour's new combination of Arquad 2C and Ethomeen® S/12, a polyethoxylated amine. Latests reports indicate that the use of these chemicals for pigment dispersion can result in numerous advantages in production and finished product.



After several months aging, plastisols containing pigments coated with Armour chemicals (at left) remain fluid.

Using pigments coated with these chemicals, manufacturers can improve viscosity stability in plastisols, lower initial viscosity, maintain longer working periods for the plastisols, and reduce water and soapy-water extraction. Coatings of Arquad 2C and Ethomeen S/12 will also result in reduced processing time for inclusion of the pigment into the plastisol.

For additional information on all these Armour chemicals for the plastics industry, and for samples for your own testing, use the convenient coupon.

NEW DEVELOPMENTS FROM ARMOUR

Armid O

for polypropylene and low pressure polyethylene

Some of the most recent ideas in the plastics industry have come from manufacturers who are investigating new plastic materials.

Two such materials, that have come to light, are polypropylene and low pressure polyethylene. With the increasing use of these versatile materials, the need for certain formulation improvements has become apparent.

In keeping pace with these current developments, manufacturers examined the possibilities of using Armid O in the modification of polypropylene and low pressure polyethylene. Initial investigation has indicated that Armid O is effective in preventing blocking in these plastics, and imparts the same advantages that it does in polyethylene—improved extrusion and more easily handled products.

For additional information on Armid O for polypropylene and low pressure polyethylene, and for samples for your own testing, use the convenient coupon.

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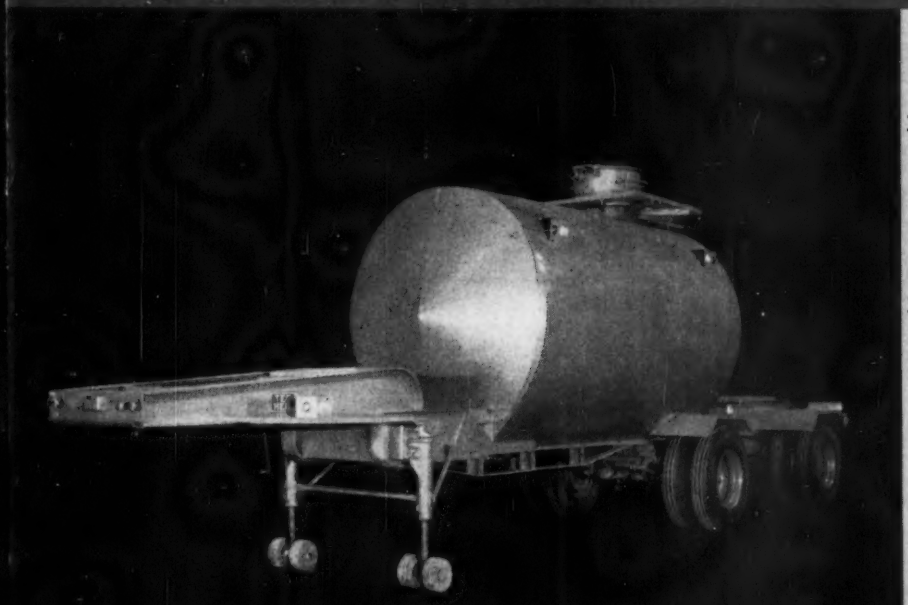
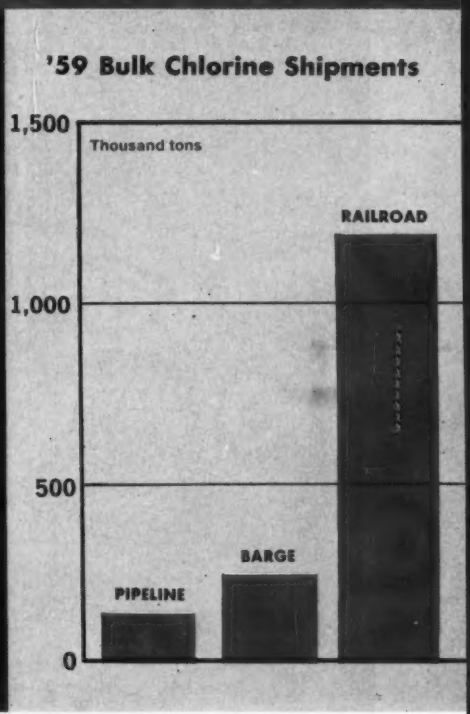
Tank Trucks Gear for Bulk Chlorine Hauls But Railroads Hold Big Lead.



New truck promises chlorine shippers and users lower costs, faster service.



Tank Truck Bids for Bulk Chlorine Traffic

Last week a new way to ship chlorine in bulk—by tank truck—made its long-awaited U.S. debut. Food Machinery and Chemical Corp.'s Chlor-Alkali Division and Dover Chemical Corp. (Dover, O.) jointly made the first commercial shipment. For chlorine producers and users, the new mode of transportation could mean greater shipping flexibility, lower costs, reduced transit times.

Although tank-truck shipments of chlorine are common in Europe, Cuba and Mexico, and similar moves by other U.S. producers have been in the wind for years, the FMC-Dover shipment marks the first such project in the U.S.

Under an FMC-Dover agreement, Dover will operate its own specially designed 16-ton-capacity tank truck between its Dover, O., plant and FMC's South Charleston, W. Va., site —a distance of some 200 miles.

Robert Cohen, president of Dover, tells CHEMICAL WEEK he expects truck deliveries of chlorine to cut the in-transit time from six days to one, cost less than the current rail delivery. In fact, Cohen expects to write off the cost of the new truck from freight savings.

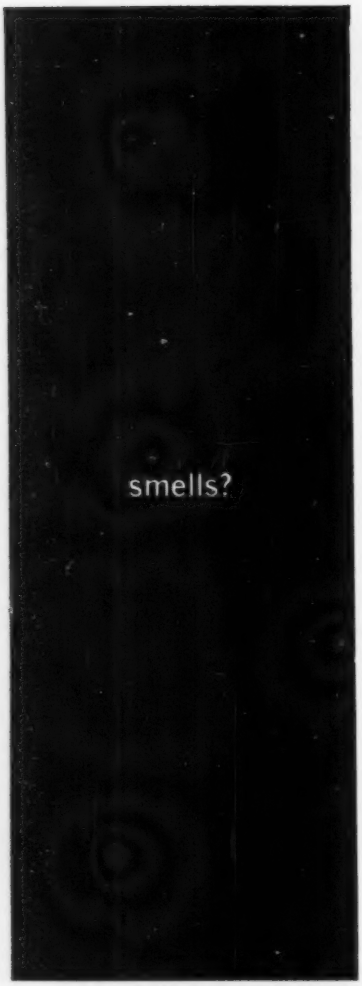
Widespread Pessimism: But other chlorine producers and users are not so sure that tank-truck shipments are the answer. Despite the pressure that truck movements will put on railroads for rate adjustments, many producers feel that they could do more harm than good for the industry.

Behind their thinking is a concern for safety. The industry, they say, has amassed an admirable safety record. Now, it's charged, tank trucks hauling chlorine over congested highways and through communities will expose the public to undue risks.

Jobbers and repackagers are watching the move closely, too, hoping it will not start a general trend toward tank-truck shipments that could disrupt their businesses. (Some cylinder-quantity users might convert to tank-truck deliveries.) Several local jobbers already have expressed concern, and some have temporarily halted expansions of their cylinder-loading facilities to evaluate this development.

Chlorine Channels: Over the years, railroads have hauled most of the bulk chlorine in the U.S. In '59, for example, the nation's fleet of 4,500 tank cars carried nearly 1.2 million tons of material, over half of all bulk chlorine shipped. (Twenty-four of the 38 U.S. chlorine producers are set up to load rail cars, while only 14 of them have facilities for loading 1-ton containers. And only eight producers load cylinders, while seven of them are equipped to load barges.)

One important reason for this dependence on rail is safety. Users generally take their chlorine directly from the shipping "container." Thus, if



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Roundup of Rail Tank Cars for Bulk Chlorine

Car Capacity (gallons)	Chlorine Capacity (tons)	Cars in U.S.
3,000	16	350
5,900	30	1,100
10,600	55	2,700
(1)	15	375

(1) Multi-unit tank cars. No cubic capacity given, since chlorine is carried as a gas in 1-ton cylinders, not as a liquid as in other tank cars.
Source: Chlorine Institute.

danger threatens a user's chlorine supply stored in a tank car, he can quickly move it out of the plant, away from equipment and workers.

But shipping by rail has its drawbacks, say many producers.

More of them are voicing dissatisfaction with rail rates they claim are too high. Added to this is the inconvenience of occasional long waits for badly needed material. Moreover, many smaller users—particularly paper mills and water purification plants—are located off the rail lines, and thus pay premium prices for chlorine for two reasons: they must buy in 1-ton containers, and transfer material to trucks to get it from railroad sidings to their plants.

Dover's Problems: High freight rates, frequent long transit delays and a steadily increasing demand for its own chlorine-based products prompted Dover in '56 to begin investigating tank-truck shipment of chlorine.

On three separate occasions, tank cars actually were lost in transit. At other times, misplaced orders forced costly delays in chlorine shipments. Tank-truck proponents believe that trucks, with their much shorter in-transit time, could do a better job.

After deciding to take a close look at tank-truck transportation to help solve these problems, Dover polled major chlorine producers to learn which ones might be interested. Result: only FMC showed enough interest in the future of tank-truck shipments to warrant a joint study.

Getting a Truck: First problem, of course, was getting a truck to haul chlorine safely over busy U.S. highways. (Vehicles being used successfully in England, Cuba, and Mexico are not suitable for service in the U.S. under Interstate Commerce Commission standards.)

Moreover, not one of the major tank-truck makers would bid on a trailer designed specifically for chlorine. (An ICC specification—MC-330—had been approved since '55, when Stauffer had planned to begin such shipments to plants on the West Coast, but that plan was dropped.)

Dover proceeded to subcontract design and construction work on a trailer that would meet ICC specifications. In addition, both Dover and FMC installed facilities for loading and unloading tank trailers.

Built Like a Tank: After more than four years of cooperative effort, Dover's trailer was ready last week for its first commercial run. One observer who saw it commented that it was built "like a tank."

Weighing just under 32 tons fully loaded, the tractor-trailer combination can haul 31,500 lbs. (2,450 gal.) of chlorine per trip. That's equivalent to the capacity of the smallest (16-ton) rail cars.

It has 4 in. of cork insulation between the double shells—the outer one is of low-weight aluminum, the

Sinclair

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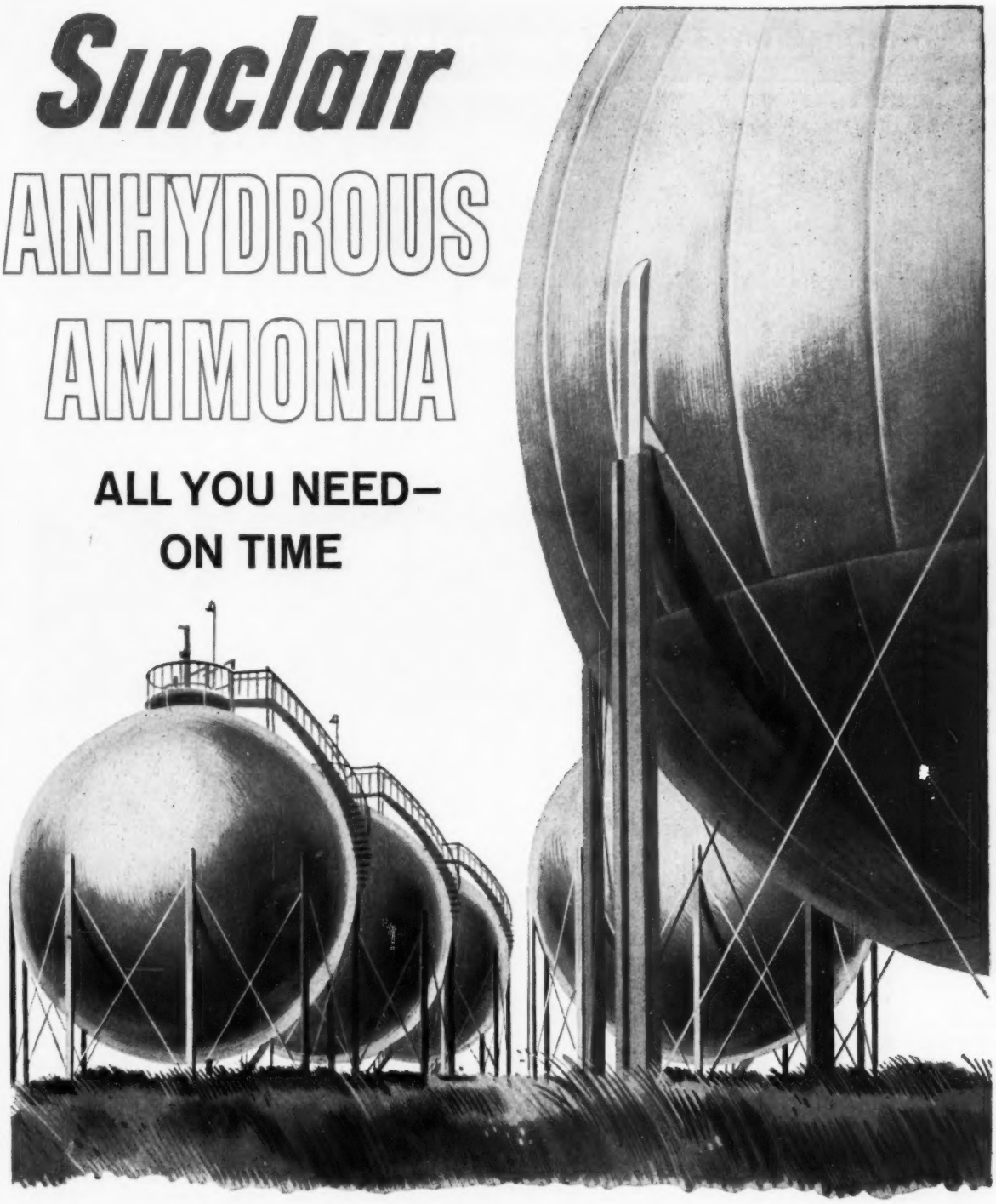

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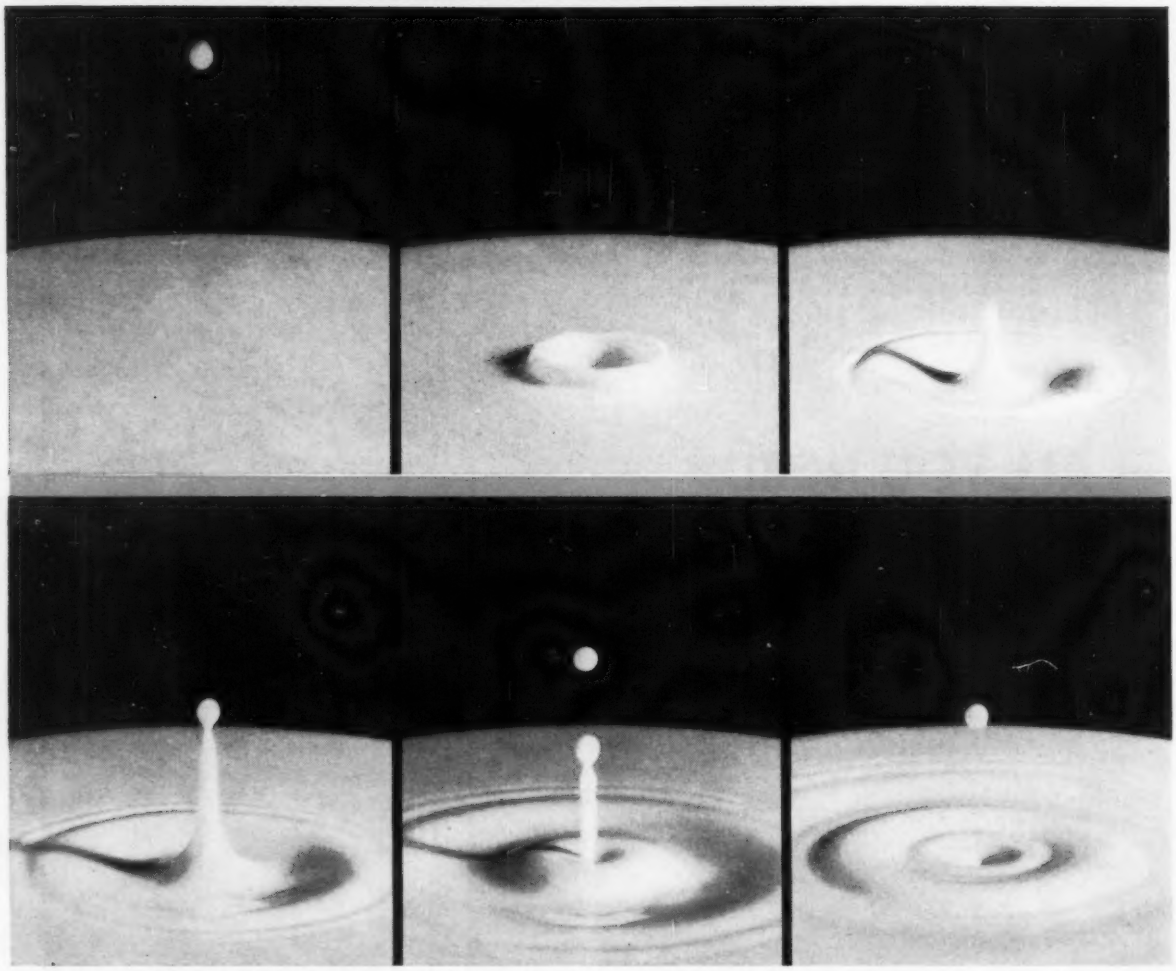
Naugatuck LATEX and COMPOUNDS



No one knows latex like NAUGATUCK

From the day Naugatuck Chemical first made the use of natural rubber latex practical, its laboratories have been constantly adding to Naugatuck's "library," answering questions as they arose, developing new natural, synthetic, and plastic latices and compounds... leading the way to exciting new applications that are even now helping to revolutionize the world around us.

New tougher-than-ever paints, fabrics that need no weaving, adhesives that seal and reseal, papers that retain their strength even when wet are but a few of the products this knowledge has led to. The list is almost endless, and daily growing more so.

While you may not particularly care what happens when a drop of latex falls into a vat (as illustrated in the sequence of pictures above), it's part of the knowledge that may well be of value in applying latex to your own product.

See what Naugatuck's knowledge of latex and compounds can mean to you—in latices for your own further compounding or in ready-to-use LOTOLS® specially compounded to meet your needs by the world's leading supplier of latex compounds. Contact your Naugatuck Representative or the address below.

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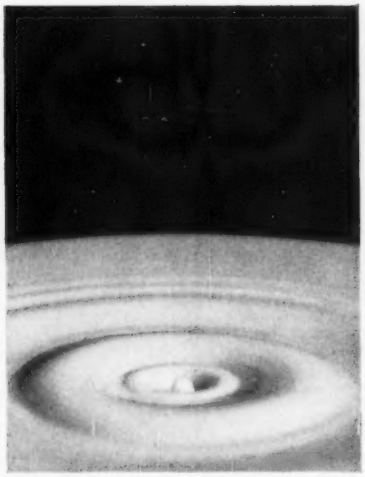

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inner shell is of ½-in.-thick special high-nickel-content steel, used to provide maximum low-temperature strength. Cost of the completed trailer is about $20,000.

Dover's President Cohen figures the new truck will provide certain "fringe" benefits, too. Among them: insurance against railroad strikes—a good talking point for his salesmen.

Drawbacks: But shipping via tank trailer poses some problems, Cohen points out. Unloading the truck calls for more hook-up time than comparable rail-tank cars. This may add to the labor costs of handling the material.

And spotting the truck—placing it in position for loading or unloading—may be more difficult than with tank cars.

Ahead: It's too early to foresee exactly what the advent of tank-truck shipments of chlorine will mean to producers and users. Railroad officials will likely take note that this new means of shipping the material is available, may even budge a little on rate negotiations, if producers threaten to haul by truck. This is happening right now in Canada, where several producers may soon begin chlorine tank-truck movements to combat high rail rates.

Small-to-medium-volume buyers—especially those located away from rail lines—probably will show keen interest in the new shipping scheme, may be after producers to set up similar arrangements. But this much is clear: no major U.S. chlorine producer is interested in getting into the chlorine tank-truck business; even FMC figures that the only way this type of plan can grow is for users to buy their own trucks.

Safety, of course, remains as the biggest question. But most knowledgeable shipping men say that truck shipments are only slightly more hazardous than rail shipments. Says one: "It would take a direct collision with a moving train to smash that truck."

Generally, chlorine men concede that this new means of shipping their product will find a definite role. They differ, though, in their opinion of how broadly and rapidly it will develop. Some contend it will never be more than a special-purpose shipping tool. Others foresee a steady, though rather slow, growth, complementing existing means of chlorine distribution.

Barge vs. Rail: Act 1

This week the Interstate Commerce Commission began hearings in Washington, D.C., on the thorny question of a railroad's right to unrestricted ownership of a barge line.

The hearings, being held before ICC Examiner Hyman Blond, are probing an application by the Illinois Central and Southern Pacific railroads to purchase John I. Hay Co., a major barge line operating on the Mississippi River system.

Testifying at the hearings—and marshaled against the purchase—is the shallow-draft water carrier industry represented by American Waterways Operators, Inc. Water carriers see the proposed purchase as "an attempt to scuttle the independent water carriers' ability to return to the public benefits that result from development and use of inland navigable channels. If the railroads acquire control of water carriers . . . they can also control the rate situation in their own interests, and inevitably they will." This, they say, would lead to higher transportation costs, which industry, such as the CPI, would have to bear.

The railroads, on the other hand, argue that their purchase of the barge line—every mile of which parallels the railroads' right-of-way—would not reduce competition on the route. As one railroad spokesman put it, "If we're a transportation company, we should be a transportation company. Why limit us to the rails? We're restricted to our present mode, but private firms aren't."

Change in Tactics: Up to now, the main objection of the barge operators against the proposed purchase is that it would set a precedent by allowing a railroad to own a barge line with no restrictions on its operations. This, they reason, would drastically reduce barge line-railroad competition. (Railroads now own some barge lines, but they are restricted to supplementary service.)

Now, however, AWO is attacking the proposal as being illegal under the Panama Canal Act of 1912. This is a controversial question that ICC will have to decide. The Panama Canal Act expanded ICC's regulatory authority over rail and water transportation by empowering it to establish routes between rail and water carriers for transportation of property across

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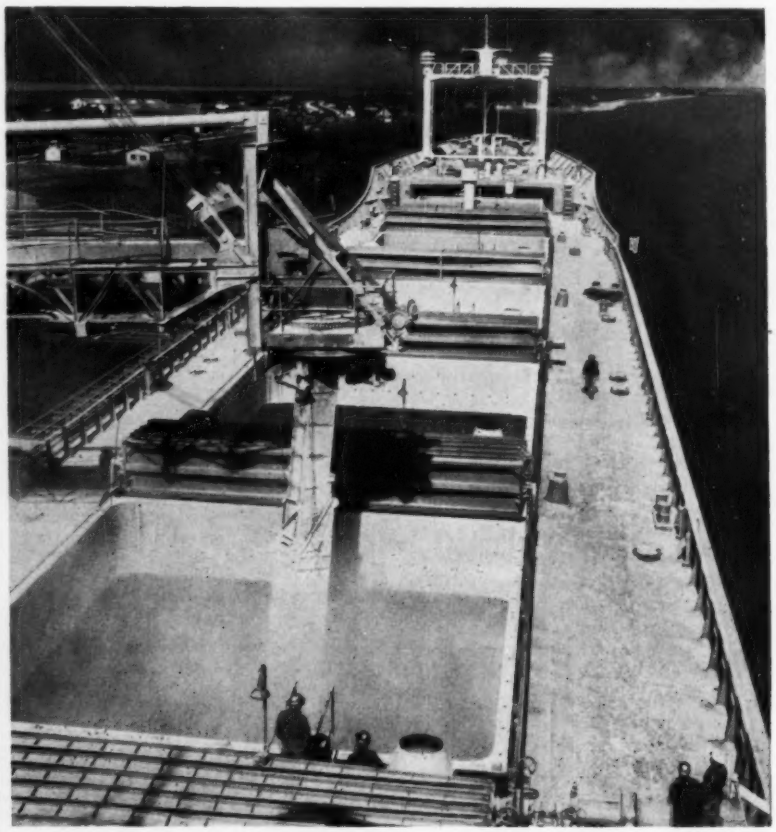
state lines, and to prescribe maximum joint rates for such transportation. The Transportation Act of 1940 amended the Canal Act to extend ICC's jurisdiction over water carriers operating coastwise, intercoastal and on inland waterways.

Waterway operators view this case as one of the most important challenges to face their industry in years. They strongly oppose the purchase, and the final decision could be delayed for several years by legal maneuvering, regardless of which side wins the initial round. But, say observers, ICC could end it quickly by declaring the proposed purchase in violation of the Canal Act, dismissing the purchase request.

CPI Freight Derailed

Last week U.S. railroad executives —already deeply concerned over diversion of traffic to trucking lines and attacks from bargemen (*see p. 35*)— had new worries. Just-released Interstate Commerce Commission freight statistics for third-quarter '59 show chemical rail freight below second-quarter figures by a significant margin. And CPI traffic managers can't ignore the implications of "poor health" in the nation's Class I railroads.

Although the railroads expect an annual growth in total business of 3-5%, this rate is well behind that of other key industries, reflects a steady trend toward diversion of freight traf-



Loading Up for Record Sulfur Haul

On its way this week is the Norwegian ship *H. L. Lorentzen,* en route to Rotterdam, the Netherlands, and Hamburg, Germany, with the largest single sulfur shipment ever made: 20,900 long tons of 99.98%-pure bulk sulfur. The material—shipped by Sulphur Export Corp., overseas sales agency for major U.S. sulfur producers—was loaded by Freeport Sulphur Co. at Port Sulphur, La. The previous record shipment was 18,355 l.t.

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fic to trucks (*CW, Jan. 23, p. 79*).

CPI shippers, while anxious to take advantage of more favorable rates and the improved service that truck-rail competition brings, don't want to see the railroads get into too much trouble. "Competition between the two carriers is healthy," they say, "but we need them both."

But the railroads are in trouble as far as chemical freight is concerned, and the current statistics indicate how much. ICC statistics show that the third-quarter chemical freight traffic declined in carloadings, number of tons and dollar revenue. Second-quarter figures had registered a modest increase in chemical traffic over the first quarter. And rail spokesmen say that full '59 figures will show a slight increase over '58. In total ton-miles, however, the railroads dropped 0.9% in '58 from '57, are expected to show a similar or more drastic drop for '59.

Total third-quarter carloadings of chemicals was 533,787, compared with 676,585 in the preceding quarter. Number of tons hauled: 22,680,568, compared with 29,094,917. Gross revenue: $116.3 million vs. $142.2 million.

Chemicals not otherwise classified, the group comprising the bulk of all chemicals covered by the ICI statistics, accounted for 153,880 carloadings, 5,520,091 tons and $38.4-million gross revenue. Sodium (soda) products accounted for 102,853 carloadings, 5,284,311 tons and $22.7-million gross revenue. A total of 7,679,789 tons of fertilizers were hauled in 155,245 carloads, and grossed $28.2 million.

DATA DIGEST

• **Vitro Offering:** New brochure describes products and services of Vitro Chemical Co., newly reorganized division of Vitro Corp. of America. It also displays new symbol and packages, lists 46 chemical and metallurgical products, including cobalt, nickel, vanadium, uranium, zirconium salts, rare earths and thorium chemicals, metals and alloys. Vitro Corp. of America (New York).

• **Polypropylene:** New brochure furnishes property and application data on polypropylene plastic. Catalin Corp. of America (New York).

• **Polycarbonate Resin:** New, four-page color brochure (TIB 41-M1) describes physical and electrical properties of Merlon, a linear aromatic polyester of carbonic acid, and compares Merlon with seven other plastics to show the new thermoplastic's suitability for engineering applications. Mobay Products Co., subsidiary of Mobay Chemical Co. (Pittsburgh, Pa.).

• **Aluminum:** New, 20-page color booklet "Aluminum for Architecture" provides information for selection of aluminum alloys and surface finishes for building-industry applications. It also includes information on company designations and National Assn. of Architectural Metal Manufacturers counterparts, descriptions of textured, bright or satin surfaces, electrochemical and chemical finishes, and charts on available alloys. Metals Division, Olin Mathieson Chemical Corp. (New York).

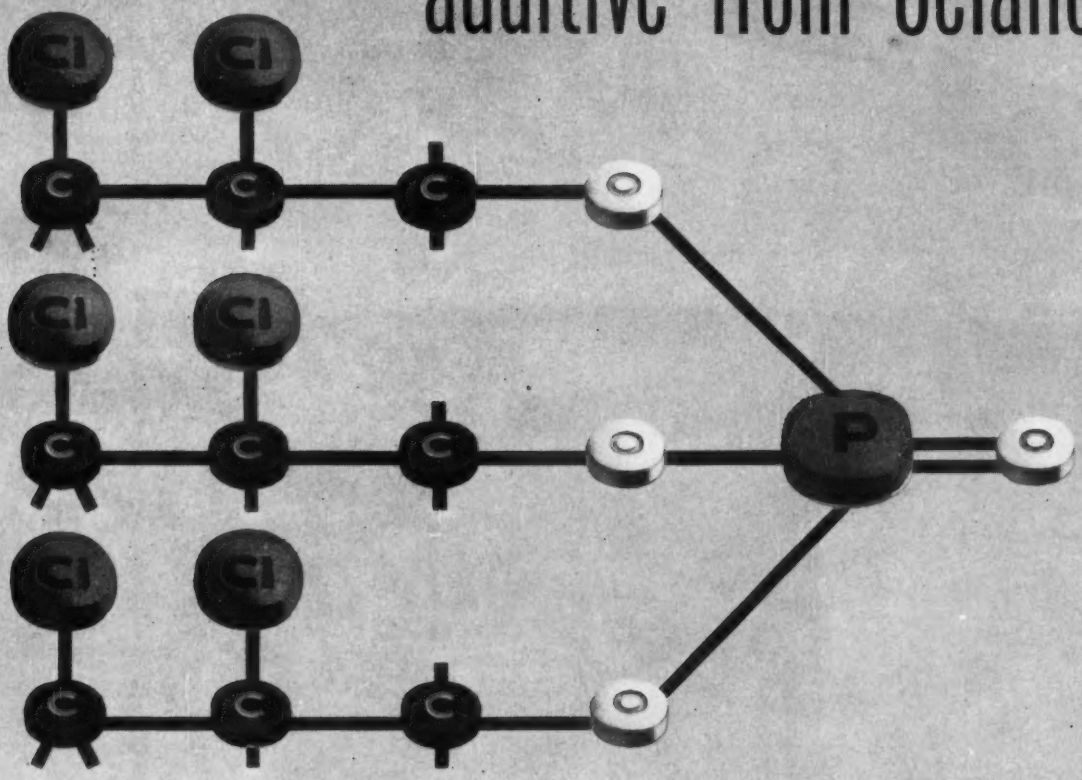
• **Solithane 113:** Eight-page color bulletin describes physical and electrical properties, new formulations and processing procedure of electrical-grade compounds, including Solithane 113 and catalysts. It's the latest bulletin in Solithane 113 casting resin series. Thiokol Chemical Corp. (Trenton, N.J.).

• **Molybdenum Diagrams:** New, 12-page bulletin provides data and selected references on binary and more complex diagrams pertaining to molybdenum. In this latest bulletin in "Molybdenum Metal Technical Notes" series, each system is covered in a brief summary of present knowledge, followed by a set of references from a wide range of technical publications containing details of research. Climax Molybdenum Co., division of American Metal Climax, Inc. (New York).

• **More Molybdenum:** New, 12-page brochure describes applications, physical properties and production processes of molybdenum, explores new avenues of application opened by recent technological advances in refractory metals field. Sylvania Electric Products Inc., Metallurgical Division (Towanda, Pa.).

• **High-Purity Indium:** Data sheet describes three grades of high-purity indium, available in purities up to 99.999%. Suggested uses: alloys for glass sealing, solder, electrical contacts, low melting applications, as well as chromium bath additives, thermisters, and nuclear shielding materials. High Purity Metals, Inc. (340 Hudson St. Hackensack, N.J.).

a new fire-retardant additive from Celanese



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Washington
Newsletter

CHEMICAL WEEK
March 19, 1960

The tie-up in all legislation during the civil rights fight means that some of the measures sought by business—and some of the measures opposed—will have less chance of getting through. With political conventions coming up in July, Congress will pack up and leave whether it has finished its business or not.

Some of the touchier issues that require lengthy consideration will go by the board, including tax incentives for overseas investment, retirement benefits for the self-employed, extended minimum wage coverage, and slum clearance.

Says one top Republican: "The best thing about this civil rights filibuster is that it has more big-spending bills pigeonholed than you could bury with a shovel."

•

Depreciation legislation has run into a stumbling block in the House Ways and Means Committee hearings. The Treasury wants to change the law to require companies to pay the 52% corporate income tax on sales of fully depreciated equipment. As things stand now, the law permits a 25% capital gains rate on income from such sales.

Dispute over this point will slow down movement of the bill and possibly endanger chance of passage. The Treasury says the estimated $300 million more that taxpayers would have to pay would be offset by more liberal depreciation allowances. It says it would instruct internal revenue agents to be more lenient in allowing businessmen the rate of depreciation they think they should have.

Some businessmen are leery of this, however. They recall other cases in which agents have been tougher in the field than policy in Washington seemed to warrant. They want some language in the bill that will guarantee the more liberal administration of the law that Treasury promises.

•

Industrial leaders will confer on export problems at a series of meetings at the Commerce Dept. in the next few weeks. Paper and pulp people will meet March 22, industrial chemicals April 26, rubber products June 7.

The meetings will prepare government officials for next fall's negotiations on the General Agreement on Tariffs & Trade (GATT). The idea is to find out what trade barriers the U.S. should try to break down abroad to stimulate U.S. exports; or, looking at the other side of the coin, what U.S. import restrictions can be successfully cut.

The meetings are a followup to last week's conference, attended by 160 businessmen who gave their ideas on general ways to stimulate trade. After sifting the results of the conference, President Eisenhower

will launch a program in a special message he is expected to deliver personally to Congress. The proposals he will probably make:

• Limited credit guarantees from the Export-Import Bank against political hazards in selling overseas.

• Step up Commerce Dept. services to exporters and on-the-spot aid abroad (such as business attachés in embassies).

Here's why the government is so eager to increase exports: in recent years the U.S. has not been earning enough in foreign trade to recoup the dollars it spends on military and economic aid, with a resulting balance-of-payments deficit and an occasional run on U.S. gold reserves.

Reactions of businessmen at the conference just concluded were mixed. Some felt the problem should be met by cutting out foreign aid. But most felt the proposed drive would be useful if it were followed through vigorously.

•

Agriculture Secretary Benson is shying away from the food additives fight, to the disappointment of chemical makers. They have been expecting important help from his quarter.

Benson told the House Commerce Committee he prefers to wait before making any recommendations on how to handle the "no cancer" clause in the color additives legislation now under consideration. He states that reports are forthcoming from government scientists and he wants to study them.

Trouble is, Benson is caught in the same bind as the chemical industry. He can't really ask Congress to approve setting of tolerances for cancer-causing agents when scientists don't agree that "a little bit of cancer" might be all right.

•

A stack of several hundred applications for extension of time on proving the safety of food and additives is getting priority treatment at Food and Drug Administration. Meanwhile, manufacturers can keep on making the products in question until FDA decides on them.

Meanwhile, the new law went into effect smoothly with little disruption in the industry. Industry officials tell FDA and their congressmen, however, that the long-range effects—discouraging companies from going ahead with expensive research or testing on commodities that don't have large potential markets—may be more serious.

•

Sweeping changes in transportation regulations are called for in a major transportation report released by the White House this week after months of delay. The report, prepared by Secy. of Commerce Mueller, recommends that all modes of transportation pay their own way for using federally built and maintained facilities. Water carriers and airlines were specifically singled out to pay user charges, to be increased over a period of years.

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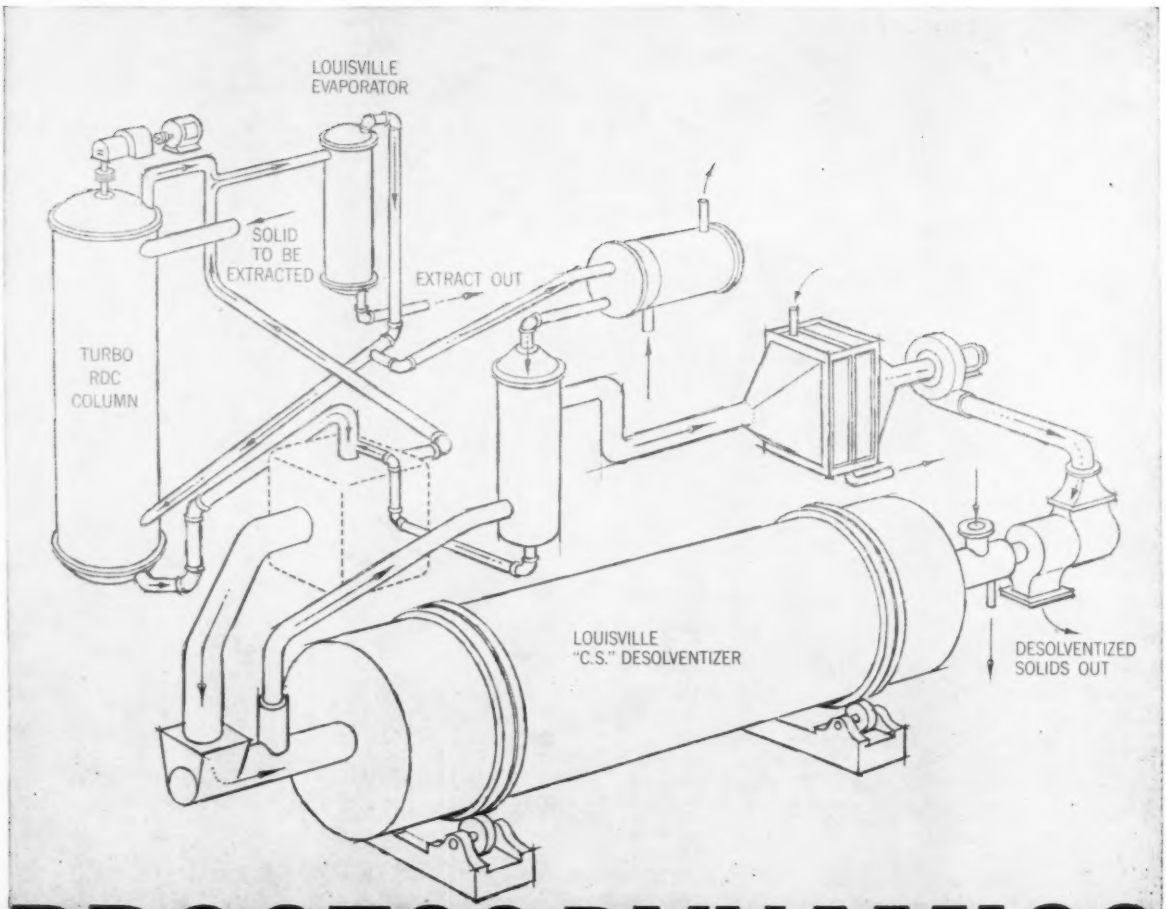

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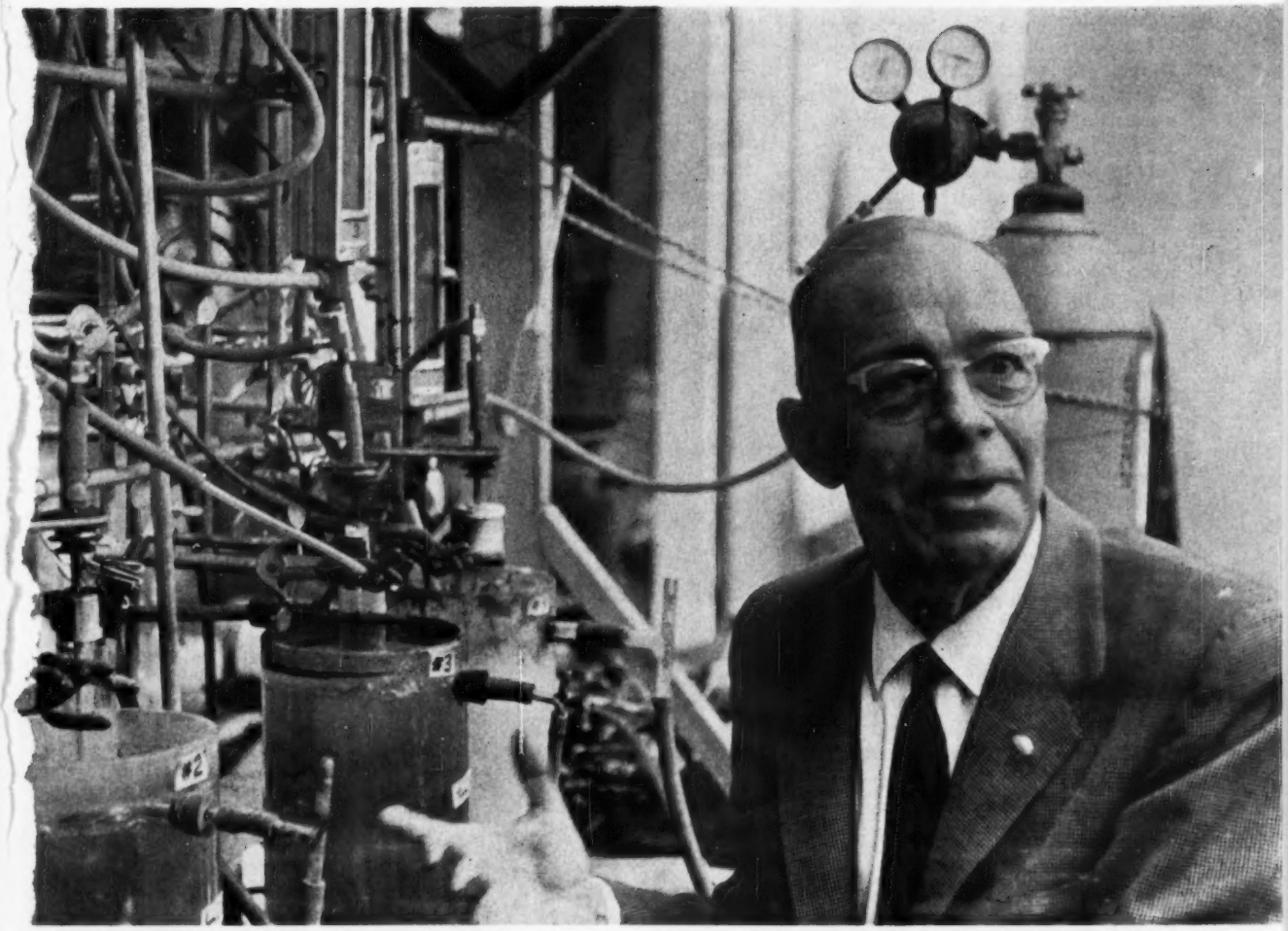


Dow's Powers stands beside miniature treatment units that help determine oxygen demand of wastes.

Plant Waste Disposal Is a Tricky Business

New plants, complex processes—plus increasing pressure from federal, state and local governments—are resulting in stepped-up spending for effective waste disposal systems throughout the chemical process industries. But designing an effective system is a lot tougher than it looks. In fact, many of the systems being installed today may never provide adequate treatment for liquid wastes. The result: costly trouble shooting will be required after the treatment plants go onstream.

This unhappy state of affairs is the prediction of Tom Powers (*above*), director of Dow Chemical's new Industrial Service Division, in an interview with CHEMICAL WEEK last week. For the past 23 years, Powers has been in charge of the Midland Division's industrial waste facilities (which Dow bills as the largest in the world).

Now, utilizing Powers' experience, Dow's new division will offer tailor-made solutions to any firm's waste disposal problems. The new service is being offered on a consulting basis. "We won't do engineering work, but will carry out all types of analytical testing, make recommendations that will complement the engineering work," says Powers. Costs might range from $10/-hour for lab tests to $750 to $2,000 for a complete service contract.

In talking to CHEMICAL WEEK, Powers touched on a number of points that should be considered in designing waste disposal facilities: first mistake that's often made, says Powers, is during the initial testing of the waste, which is required for sizing the plant.

The standard test generally accepted by government agencies is the five-day B.O.D. (Biochemical Oxygen Demand), which measures the oxygen required during stabilization of the decomposable organic matter by aerobic bacterial action. "The test is usually fine for sewage, but for industrial wastes it is tricky and can give results, in some cases, that will throw you for a loop."

Powers declares.

According to Powers, the bacteria are usually familiar with sewage, but it takes them time to become acclimatized to a particular industrial waste before they will rapidly metabolize it. The five-day B.O.D. often isn't long enough, may show 10 ppm. oxygen when it should be 100 ppm. The result: undersized facilities.

A 20-day test would catch most normal decomposition, states Powers, but this time is considered too long to be practical.

Dow has found that a silver-catalyzed dichromate test run before and after treatment gives the best determination of chemical oxygen demand.

Dilute and Steady: But even a properly sized treatment plant can get in trouble, warns Powers, and acclimatization of the bacteria is often the key. A waste that is received intermittently should not be treated intermittently, says Powers. Instead it should be diluted with others and fed to the bacteria as a uniform waste.

For example, Powers points out that bacteria that have become acclimatized to phenol wastes will not immediately begin to metabolize aniline wastes, even though they are similar to phenol.

"The waste treatment business is tricky, requires good lab work by sanitary chemists—people who are always difficult to obtain," says Powers. An example of the problems they face: building up the proper bacteria population to do the treatment job required. The bacteria that metabolize aliphatic compounds are different than those that metabolize the aromatics—even though they are often reported as the same on biological examination, according to Powers. "There has to be a mutation—a change of the bacteria's enzyme system—for the change in job."

Much of Dow's lab work on liquid waste problems is done in mini-plants (*see picture*), glass vessels to which wastes or dilute chemical compounds are continuously fed in small quantities. The proper bacteria population for metabolizing the compounds are slowly built up, and can be watched as they do their work.

Water Problem: Water wastes aren't the only disposal problems, of course. Powers estimates that Dow's Midland treatment facilities handle ten times as much burnable waste as water. But getting some wastes into burnable form is difficult from an economics standpoint.

"Burning wastes may cause air pollution problems, but they are local, can be solved more easily. Water wastes are a big problem because they can hurt you 100 miles away before you realize it," says Powers.

But many test parameters still have to be defined. Today, most authorities talk in terms of oxygen and bacteria; eventually, it will be in terms of taste and odor of the water itself," he says.

Taste Testing: Dow's Midland Division has been concerned with taste problems for 12 years. Taste panels were set up to determine the effects of chemicals on fish.

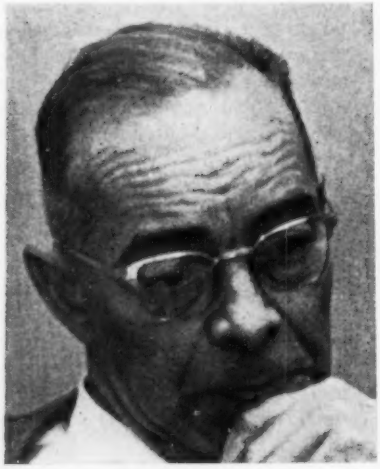
Sometimes tasting is the only way the effects of compounds can be determined. For example, five parts per billion of 2,4- and 2,6-dichlorophenol won't show up in an analysis but will show up as an off-taste in fish.

"Fish tasting is an art that the tasters must acquire. Our panelists don't dislike fish, but they can't like it too well either—we've had a few experiences where new panelists have eaten heartily, merely passed a verdict of 'delicious,' " says Powers.

Another consulting area that could prove important: deep well disposal. Dow has 30 active wells, has been using this disposal method for about 10 years. The method is still relatively new, can be used only after careful geological studies show that the wastes will not find their way back into the water supply. The method can be costly; but for material that cannot be readily disposed of (e.g., dichlorophenol), Dow feels the method is superior, less costly than activated charcoal adsorption towers.

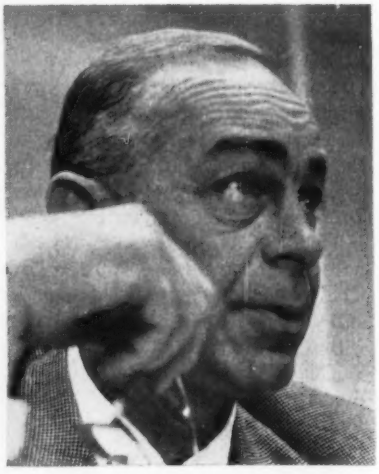
It's obvious that waste disposal is a complicated business. The complexity of waste disposal problems seldom permits simple, stock answers. And, plant investment can't be recouped through product sales. But careful advance planning can save high-cost corrective measures that may become necessary later in ill-designed systems.

'Standard test for sewage can throw you for a loop on industrial waste.'



'It takes time to build bacteria populations to metabolize a waste.'

'Water wastes are a big problem; they'll hurt you 100 miles away.'



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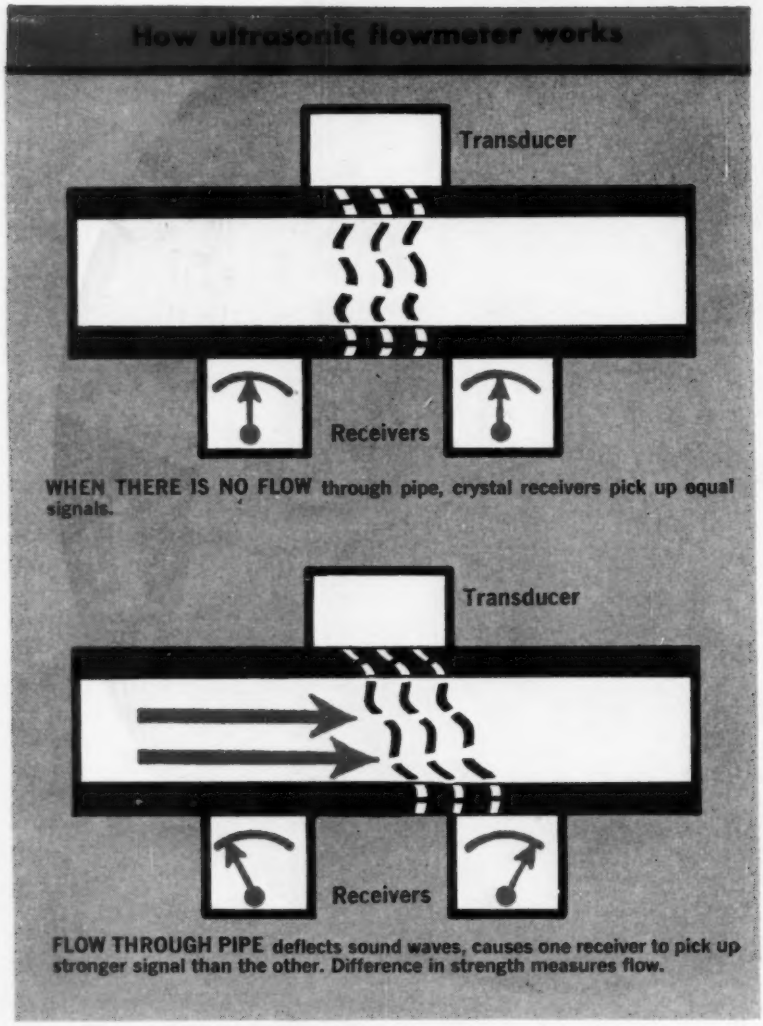

How ultrasonic flowmeter works
Transducer
Receivers
WHEN THERE IS NO FLOW through pipe, crystal receivers pick up equal signals.
Transducer
Receivers
FLOW THROUGH PIPE deflects sound waves, causes one receiver to pick up stronger signal than the other. Difference in strength measures flow.

Sound Measures the Flow

The sketch above illustrates principles on which Gulton Industries, Inc. (Metuchen, N. J.) is currently pinning its hopes for becoming the first to crack the chemical industry market with a successful ultrasonic flowmeter. Its sales pitch: process stream flow measurement without the energy-consuming flow restrictions and corrosion problems of conventional meters.

The meter, which will be sold for water and sewage metering by Hersey-Sparling Meter Co. (Dedham, Mass.), cosponsor of the development project, measures the deflection of an ultrasonic beam shot across the flow stream. The technique differs radically from previous tries at ultrasonic flowmetering, which measured the travel time of an ultrasonic pulse sent through a length of pipe with the process stream.

The earlier meter designs gave erratic readings, were never made commercially. Gulton claims the new meter has an accuracy of ± 1½%, and repeatability of ± 2%—both figures that would make it acceptable for most process applications. And, although Gulton will not reveal prices, it says they will be competitive with other meters giving comparable results for a given application.

Free Flow: The key feature of the meter is its elimination of all measuring elements inside the pipe. The ultrasonic beam is generated by a piezoelectric ceramic (lead zirconate titanate) transducer attached to the outside wall of the pipe. The crystal receivers are also on the outside wall.

The transducer and receiver are attached to a special section of pipe, which has a wall thickness at the points of attachment machined to a multiple of a half-wave length of the sound produced in the pipe. The pipe section length is about the same as that of an ordinary valve.

One drawback: pipe diameters less than 2 in. do not provide sufficient span for obtaining a measurable beam deflection.

Now the only pipe materials tested are bronze, cast iron, stainless steel. But Walter Welkowitz, codeveloper of the meter with Hugo Dahlke, believes that materials such as Teflon, saran, polyvinyl chloride, glass and copper will cause little trouble. Fiber glass and Haveg (asbestos fiber with phenolic binder) may cause problems.

The meter can be used with 115-volt, ac. source, or, in the case of portable meters that can be attached to the transducer and receivers, with a battery source.

Chemical Outlook: Welkowitz says that although water and sewage flowmetering applications are clear-cut, chemical industry applications will have to be solved on an individual basis. Points of consideration: heat and liquid viscosity.

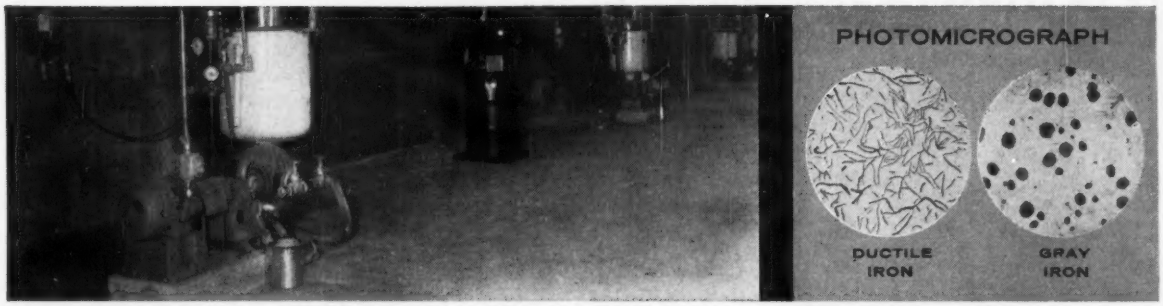
The ceramic transducers on the prototype meter have a temperature range of —300 to 450 F; substitution of quartz transducers would permit use for measuring fluid temperatures to 800 F, perhaps even as high as 900 F.

Welkowitz won't give viscosity limits, says the range will depend on the properties of individual liquids. Highly viscous liquids will not transmit the transducer's sound waves. But the meter will compensate for variations in fluid viscosity, a problem with many flowmeters now in use.

Pipe vibrations due to liquid flow present no problem; the meter's frequency band is so narrow, that the probability of interference is very slight, according to Welkowitz. And, operating voltage fluctuations are automatically compensated for. However, liquids with large quantities of

PUMPAGE

Goulds news about pumps for process industries



Glassed pump keeps tattletale gray out of light bulbs

Sylvania Electric Products Co. uses an abrasive slurry of hard fine phosphor particles in a xylol solution to coat the inside of its fluorescent tubes.

This slurry has always been hard to handle. It quickly eroded metal pumps which then contaminated and discolored the slurry. Discoloration increased rejects. A pneumatic system was tried . . . it needed constant monitoring and created a vapor hazard.

Sylvania engineers installed a Goulds-Pfaudler test pump, estimating a nine-month life would pay for the pump. *Over two years later*, the pump shows no wear or foreseeable future problems.

Sylvania now has four Goulds-Pfaudler glassed pumps, each running about 80 hours per week and handling 30 gpm of slurry against a 30-ft. head.

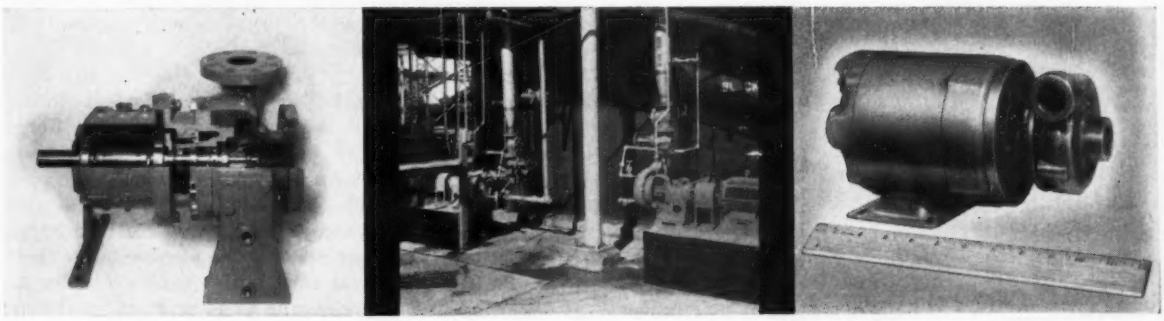
This simple, completely enclosed system ends vapor hazard, involved pipes and controls, and the need for constant monitoring. The inert glass protects product purity.

The ductile iron difference

To make ductile iron, magnesium is added to molten cast iron, changing the sharp, thin graphite flakes to spheroids. The spheroids have large areas of iron matrix between them, and since they have no sharp edges, the ductile iron has far greater strength than the original cast iron.

Ductile iron is so tough it can be used in many applications previously requiring cast steel.

It might pay you to look into this. Write us for information on ductile iron pumps or parts.



Pump with cold feet

The Goulds Model 3775, available in steel and any of the stainlesses, handles temperatures to 600° F because of its cooled support, bearing and seal chamber construction.

It is ideal for handling flammable or otherwise dangerous liquids, withstands thermal shock.

For information on this, or other products on this page, write Goulds Pumps, Inc., Dept. CW-30, Seneca Falls, N. Y.

Vicious viscous kept moving

Over 100 Goulds pumps do a wide variety of pumping jobs at Marathon Southern Corporation.

Among them are two tough 3715's. These keep abrasive, viscous black liquor moving. Each handles 200 gpm to a head of 65 ft. Stainless steel 316 construction resists the bite of hot, abrasive liquor.

Choose construction materials best suited for you when you get the Model 3715. Write for Bulletin 725.4 which lists available materials.

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entrained gases can't be metered accurately, since gas can't be metered by ultrasonic waves, Welkowitz says. (Problems of accuracy also arise in using conventional meters in measuring liquids with entrained gases.)

The ultrasonic meter, with its limitations, is no flow measurement cure-all. But if its advantages prove out in the field, it will be a welcome addition for process stream flow measurement.

EQUIPMENT

Gasket Material: American Felt Co. (Glenville, Conn.) is out with a new synthetic-fiber-reinforced Teflon material for corrosive-service and high- and low-temperature gaskets. Vistex III, as it is called, comes in sheets as large as 30 x 60 in. with thicknesses from $\frac{1}{64}$ to $\frac{1}{8}$ in.

•

Liquid-Oxygen Handling: M. Setlow & Son, Inc. (131 Chestnut St., New Haven, Conn.) is offering a new, vinyl-coated glass cloth safety garment that completely covers head and body. Designed for protection from liquid oxygen, the suit is also acid- and abrasive-resistant.

•

Porous Metal Filter: Porostrand is Bendix Filter Division of Bendix Aviation Corp.'s (434 W. 12 Mile Road, Madison Heights, Wis.) new, low-cost addition to its line of wound-wire porous metals. It can be used for surface or depth filtration, has controlled pore sizes of 25 and 50 microns (absolute) and 10 and 20 microns (nominal particle size). The filter is offered in various shapes including cylinders and cones, in various metals including iron, nickel and cobalt alloys, tungsten and molybdenum.

•

Liquid Weighing: Bell Corp. (P.O. Box 849, Odessa, Tex.) offers a new, completely pneumatic liquid densiometer for continuous weighing of liquids at continuous or varying flow rates. The densiometer is made of stainless steel, uses a "U" tube with forced balance scale. Capacity: 20 lbs./gal. for 2.4 sp.gr. material, 0.8 lbs./gal. for 0.1 sp.gr. material. Accuracy: ± 1% (for 0.024 to 0.001 sp.gr. material).

•

Vertical Centrifuge: A vertical-type centrifuge that minimizes breakage of fragile crystalline materials is a new product of the Chemical Machinery Division of Baker Perkins Inc. (1000 Hess, Saginaw, Mich.). The 20-in. push-type unit balances itself regardless of load conditions. A triggered float automatically stops loading to give uniform batch sizes. Timers control each step of the washing and drying cycle.

•

Air-Control Regulator: Rockwell Manufacturing Co.'s Meter and Valve Division (400 N. Lexington Ave., Pittsburgh 8, Pa.) is out with a new instrument regulator that controls inlet pressures on air- and gas-operated controlling, regulating and recording devices. The unit is made of die-cast aluminum, has a maximum inlet pressure of 250 psi., outlet pressure ranges of 0-5, 5-35 and 35-100 psi.

•

Fiber-Glass Insulation: Fibrous Glass Products, Inc.'s (Alpa Plaza, Hicksville, N. Y.) line of molded fiber-glass insulation for standard pipe fittings, is now offered in four thicknesses — ½, 1, 1½ and 2 in. The fittings, which are molded in halves, can be installed with staples, soft wire and tape.

•

Carbon Dioxide Monitor: Industrial Instruments Engineering Corp. (89 Commerce Rd., Cedar Grove, N.J.) is offering a monitor for continuous indication of carbon dioxide concentrations under 2% in nitrogen gas streams. The monitor uses a thermal conductivity sensing detector to measure to an accuracy of better than ±0.05% carbon dioxide. The unit can be provided with an alarm that sounds when concentration exceeds a preset limit.

•

Electrical Structural Repair: Westinghouse Electric's Micarta Division (Hampton, S.C.) is offering new glass-mat-reinforced polyester laminates for plates, angles and sheets in electric equiment. The laminates are said to resist structural deterioration by flame, moisture, arcing, leakage currents and impact. Micarta says the material retains its physical properties at temperatures up to 130 C. Angle sizes: ⅛ in. thick, up to 60 in. long; 3/16 in. thick, up to 40 in. long. Sheet sizes: 36 in. wide, 36 to 72 in. long, ⅛ to ⅝ in. thick.

Explore new ideas with CONOCO WHITE OILS!

At one time white mineral oils were used almost exclusively in drug and cosmetic manufacturing. Today the chemical industry is discovering that Conoco white oils possess outstanding characteristics that suit them to dozens of new uses. Conoco white oils are inert, colorless and come in a Saybolt viscosity range of 500 to 40. Many manufacturers also find Conoco white oils an economical replacement for high-cost ingredients.

Here are just a few of the uses for Conoco white oils:

• **Plastics Manufacturing**—dispersants for colorants for polyethylene; replace butyl stearate to make polystyrene whiter and impart better flowability for extruding; provide a high sheen for polyvinylchloride electrical wire insulation; excellent internal lubricant for plastics.

• **Compressor Lubricants**—polyethylene and urea compressors; any compressors where lubricant contamination has been a problem.

• **Metal Hydrides**—facilitate suspension of metal hydrides in organic syntheses.

• **Textile Manufacturing**—reduce friction drastically, cutting down fiber breakage; leave no color problems on the fiber.

• **Catalyst Carriers**—because they are inert, Conoco white oils will not react with catalysts.

Find out how new uses for Conoco's RAMOL®, KREMOL® or STARLIGHT® white oils can provide a better answer to your problem. Write or call today. We'll be glad to supply you with samples and offer technical assistance.

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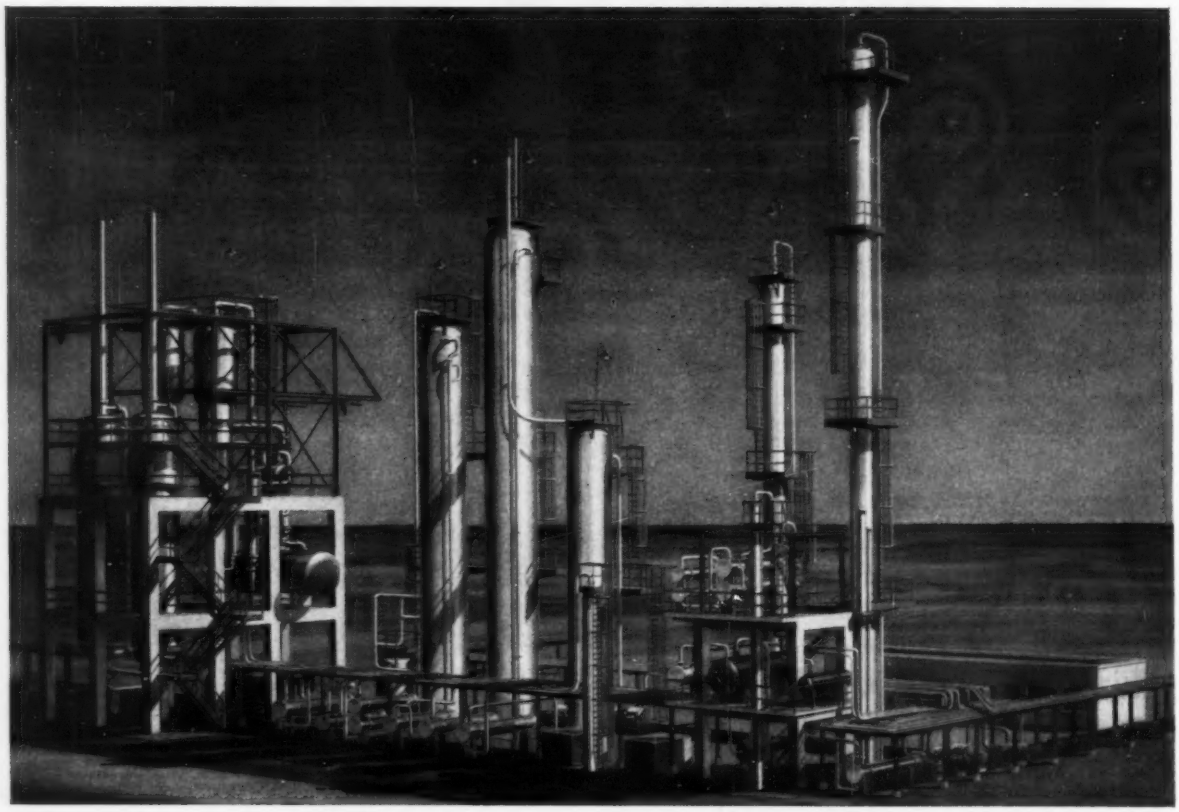
ENGINEERS AND CONSTRUCTORS FOR INDUSTRY

NEW SHELL PROCESS ETHYLENE-OXIDE PLANT TO GO ON STREAM FOR OLIN MATHIESON IN 1960



Olin Mathieson Chemical Corporation's new ethylene oxide plant at their Doe Run works, at Brandenburg, Kentucky is scheduled to go on stream late in 1960.

Engineered and constructed by The Lummus Company, the plant will employ the Shell Development Company's process for the direct oxidation of ethylene to ethylene oxide. The ethylene oxide product will be converted into derivatives for use in the manufacture of antifreeze, industrial coolants, hydraulic brake fluids, detergents and chemical intermediates.

Feed for the new plant will come from Olin Mathieson's ethylene plant, also located at Doe Run.

The new plant is part of a recently announced $30 million expansion program for Olin Mathieson's Chemicals Division. It is the fourth Shell process ethylene-oxide plant, to be designed, engineered and constructed by Lummus in the last several years. The other three are operated by Calcasieu Chemical Corporation, at Lake Charles, La.; Wyandotte Chemical Corporation at Geismar, La.; and Petrochemicals, Ltd. at Partington, England.

For ethylene oxide and ethylene glycol, or for any type of chemical or petrochemical plant, Lummus' half century of world-wide experience on more than 800 plants for the process industries is at your disposal.

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Chemicals: Chief Cause of Work Injuries in California*

	1958[2]	1957	1956	1955	1954	1953	1952
Total Occupational Injuries[1]	19,354	18,819	19,594	24,736	23,101	21,668	20,482
Gross Chemical Injuries[2]	9,853[3]	9,867	9,275	6,763	6,680	7,071	5,761

*Source: California Dept. of Public Health.
(1) Basis of reporting changed between '55 and '56 to broaden coverage of chemically caused injuries; (2) All chemical injuries, including lost-time and nonlost-time dermatitises; and allergic reactions, infections and other diseases of skin; (3) Chemical Week estimate.

Coming: More Stress on Safety Education

Armed with statistics like those shown above, the American Medical Assn. and other groups will soon be aggressively campaigning to acquaint the public with safety problems in handling chemicals in industry and at home.

If available statistics and recent developments mean anything at all, says Bernard Conley, secretary of AMA's Committee on Toxicology, the chemical industry is facing a major safety problem in the use of chemicals by the public.

Conley cites these developments to back his contention:

- Most recent estimates on occupational injury causes throughout all industry indicate that chemicals are involved in 30-40% of them.
- Workers in service trades (e.g., maintenance, cleaning, and repair) and smaller manufacturing plants (under 250 employees) are known to be especially prone to chemical accidents, and expected growth of service trades is expected to intensify this problem.
- Labor unions are showing signs of adding chemical safety matters to bargaining goals.
- AMA itself is aiming to secure stiff local and state laws regulating the labeling of hazardous chemicals. This drive could reinforce efforts to secure a national measure.

Medical Efforts: AMA, says Conley, is particularly concerned with the rising incidence of sickness, poisoning, and injury resulting from the use of chemicals, many of them inadequately labeled.

AMA is now urging the United Nations' World Health Organization to expand sections of its International Lists of Diseases and Causes of Death —dealing with agricultural poisons— from the current list of 12 chemicals to over 200.

In addition, AMA, over a 10-year period, has amassed a confidential list of some 6,000 trade named chemical products that have figured in occupational injuries.

Safety Data: Pinpointing the number of occupational injuries attributable to chemical causes is difficult. According to Conley, no reliable national figures exist. Data of the National Safety Council, he says, tend to reflect the experiences of large concerns—those that usually have excellent safety programs. And data from state workmen's compensation cases vary considerably, because of differences in state laws and definitions.

In AMA's opinion, the California statistics are the most meaningful available today. Because California has a highly diversified industrial pattern— including agriculture, oil, steel, aircraft manufacture, chemicals, etc. —Conley feels that the California data can be considered representative of the national picture. This view, he tells CHEMICAL WEEK, is based on private studies, letters to AMA from doctors in many states, discussion with various local health agencies, and talks with labor organizations.

California Picture: In 1957, the last year in which exact categorical disease breakdowns were tabulated, more than 40% of the 18,819 occupational accidents involving lost time were caused by chemicals, while in 1955, they accounted for only 27% of the total. Based on these figures, Conley makes what he calls a conservative estimate that chemicals account for 25% of all occupational injuries in the U.S. While only one in every 600 workers was injured by chemicals in 1955, in 1957 the proportion had risen to one in every 402, based on California evidence.

Warning: Unfortunately, Conley says, most people look at the number of chemical injuries and brush them off as involving light cases of dermatitis, mostly without time loss. But Conley cautions this is a false view.

"Dermatitis," he says, "is far from innocuous. In extreme cases, it can be just as disabling and expensive as poisons inhaled or swallowed." And just as important, if dermatitis ex-

posures are repeated—even if minor—cumulatively they can abet more serious forms of disease.

Moreover, he suggests, a high incidence of dermatitis indicates an environment generally predisposing to major injury from other causes. In other words, if an employer is careless about safety on minor items, he's not likely to pay much attention to the big things.

In summary, Conley points out that there are now some 500,000 tradename chemical products used in industry, including 330,000 chemicals, 55,000 pesticide formulations, and 90,000-140,000 drug preparations—and the list is growing. In that context, the number of injuries can be expected to grow, too.

Conley feels that the increasing incidence of injuries from chemicals stems from a number of sources.

One, he cites, is the tremendous growth of the commercial chemical products mentioned. Coupled with this is the conviction that it's unreasonable to expect workers in small plants, or unskilled servicemen, to be aware of the hazards of these products. And workers themselves confuse the problem because they think in terms of functions rather than materials—for example, one thinks of "cleaner" instead of carbon tetrachloride.

Another factor Conley cites is that chemical formulators often don't realize the uses—and misuses—their products will be put to. It's one thing to warn on the label that the product might cause skin rash; it's quite another to phrase warnings for a worker whose sweaty clothing is trapping the chemical against the skin.

Conley believes that the almost complete lack of safety discipline in small establishments also contributes to increasing incidence of chemical injuries. The small-plant manager, he says, seldom realizes his own problem. If, for example he has a 50-man plant and only a couple of chemical accidents a year, he's not too worried; yet his rate—one accident per 25 employees—is staggering. A corollary of this is that little has been done to show the small-plant manager the dollar value of a strong safety program—a point that has been well established by the success of programs that are in effect in many of the large chemical plants.

Conley points out that chemical manufacturers just haven't been able—nor are they sure they are obligated—to do the minute and painstaking job necessary to educate the end-users of their chemicals.

Dangers: There's considerable indication that injuries can cause plenty of trouble to buyers and users of chemical products. Much of the CPI's legal activity stems from damage suits—often for negligence — brought by chemical consumers.

If the problem continues to go unchecked, Conley believes, chemical management will be faced with several unappealing possibilities:

- Labor unions will seize the initiative in making chemical safety questions a bargaining matter. In a recent nationally published article, George Brown, assistant to President George Meany of the AFL-CIO, underscored this point with the statement that "the lines of action are clear. In industrial and commercial areas, where trade unionists are employed, there should be clauses in collective bargaining agreements recognizing our right to join with our employers in establishing safe working places and adequate labeling of chemicals, especially . . ." He urges action at the union's local level.
- Chances of bad or overly restrictive legislation increase the longer the problem goes unattended. Left unattended, or regulated by weak laws, the problem will build up a history of delay and antagonisms, while increasingly serious incidents will have more time to occur. Ultimately, radical elements will get into the act with impossible demands. Cases in point are the near-disastrous laws that were almost passed when polyethylene bag deaths were at their height.
- The problem will ultimately have an effect on consumer acceptance of chemical products. Another case in point is the current drive to ask doctors to prescribe generic chemicals rather than brandname drugs — a public response to the drug probes of the last few months.

CPI companies generally have an enviable internal safety record. Now they're faced with the need to expand those programs externally, or take the brunt of public criticism and misunderstanding. What they will do remains to be seen.

Niagara River Project

A nine-member committee, representing affected industries and communities in upper New York state, has just been formed to press for deepening and improvement of the Niagara River by the U.S.

The committee was formed by more than 40 representatives of industries and surrounding cities. A steering committee will coordinate efforts of the area to get a Congressional review on Niagara River improvements and money to pay for deepening the river to Seaway depths.

One committee member said improvement of the river could prove to be "the greatest industrial catalyst for the area." Another told CHEMICAL WEEK, "We know this will be a long, drawn-out affair, but it's worth it."

Union Claims Gains

Despite its cries of perilous times during the '57-'58 recession, the Oil, Chemical and Atomic Workers International Union has made gains in membership, contracts and member benefits during the five years since its creation by merger. Membership is up 6.5%, contracts increased by about 10%.

In planning celebration of its fifth anniversary, OCAW recalls that "five years ago, it was two separate groups of trade unionists trying to work together; now it is one united body and the old lines have been largely erased."

Though the union lost "thousands" of members through layoffs in the recession, OCAW says, "we have offset these layoffs and brought OCAW a net membership increase of 6.5%." Although the union hasn't recently reported membership figures, in times past it's put membership near 200,000.

Claiming further accomplishments, OCAW says that, while five years ago it had 1,350 contracts with employers, it now has 1,452 contracts. Claiming wide gains for its members, the union says that the average wage of OCAW members has increased 23%.

The union was formed March 4, '55, by merger of the former Oil Workers International Union and the former United Gas, Coke and Chemical Workers of America.

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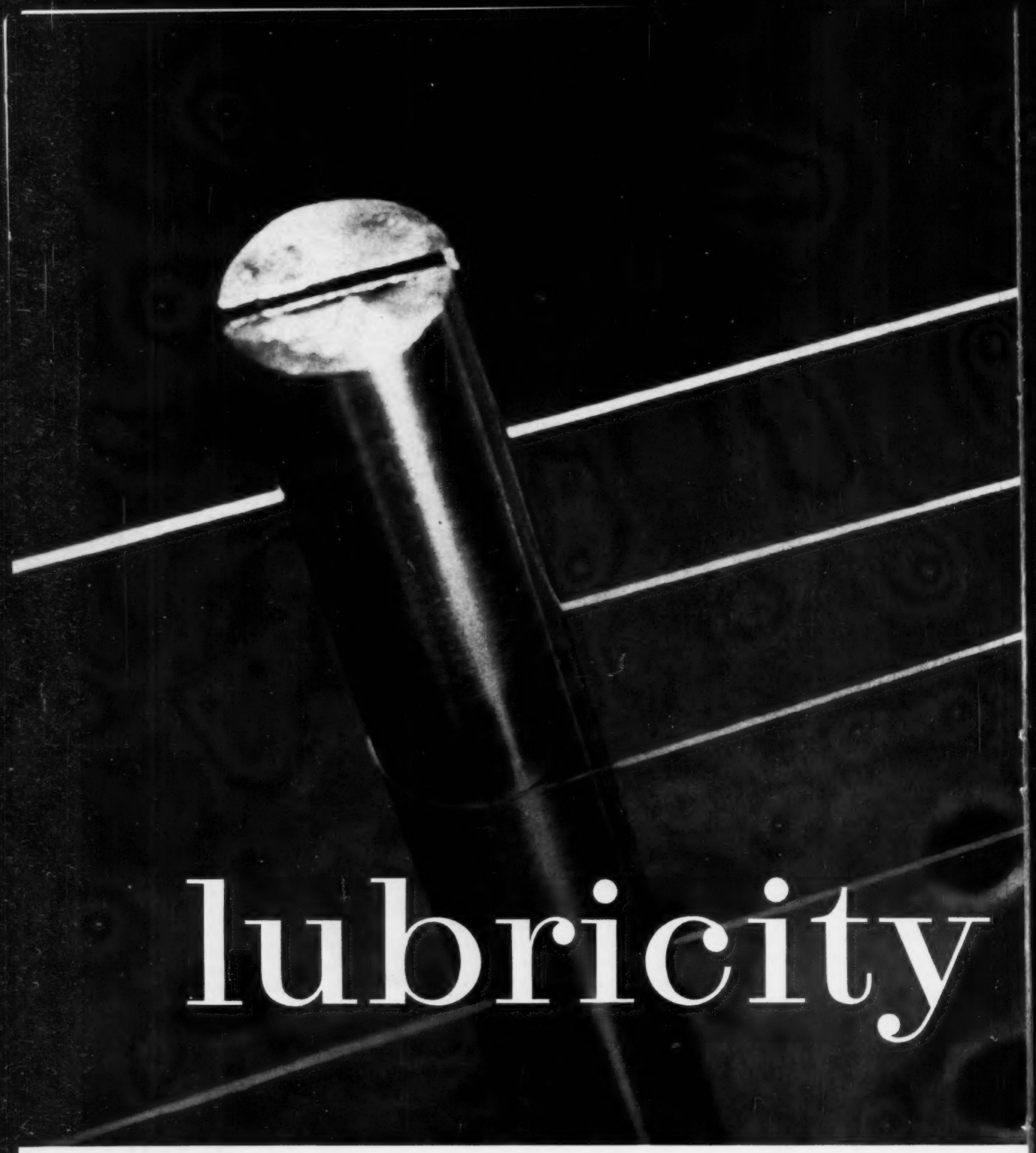

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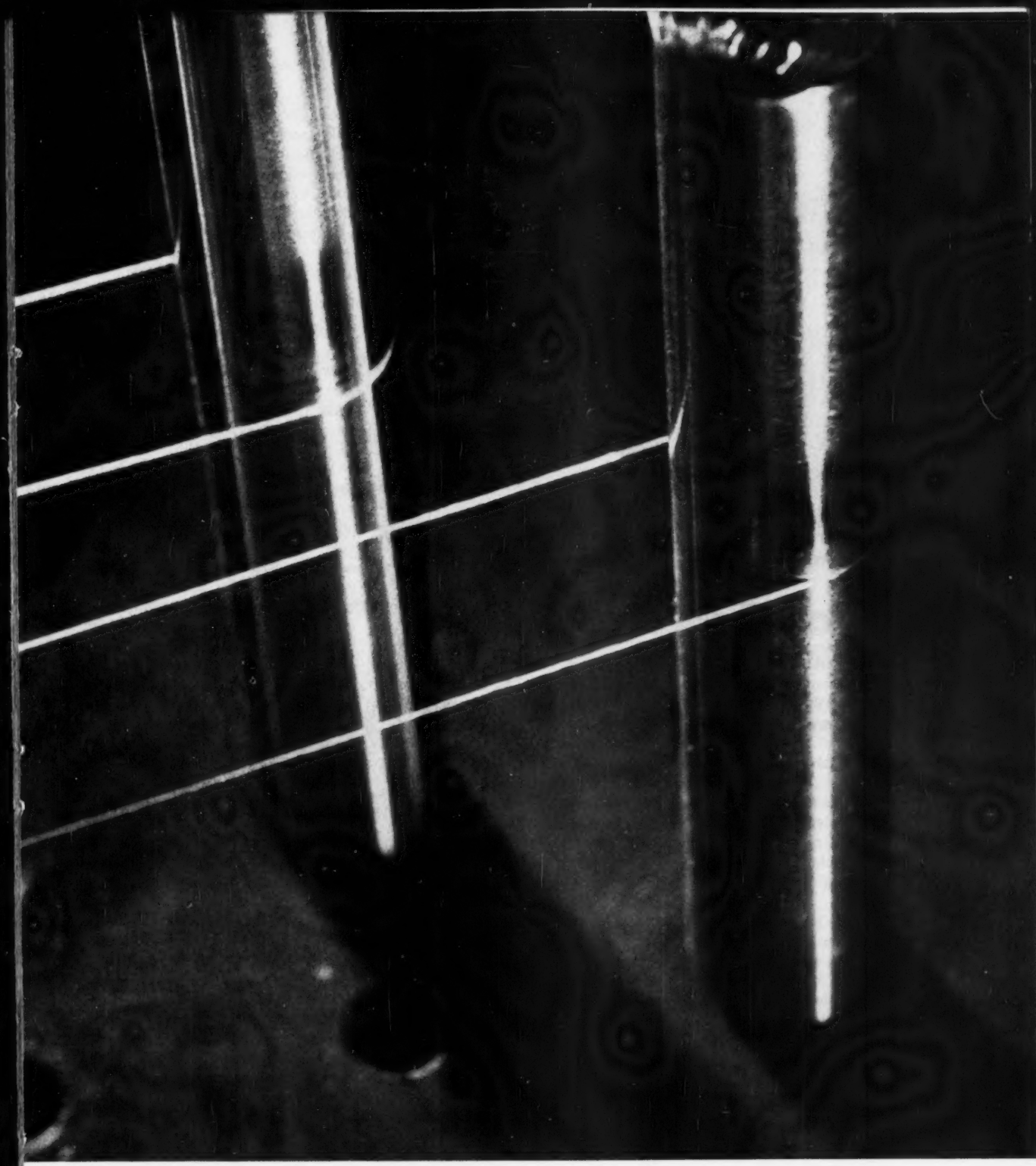

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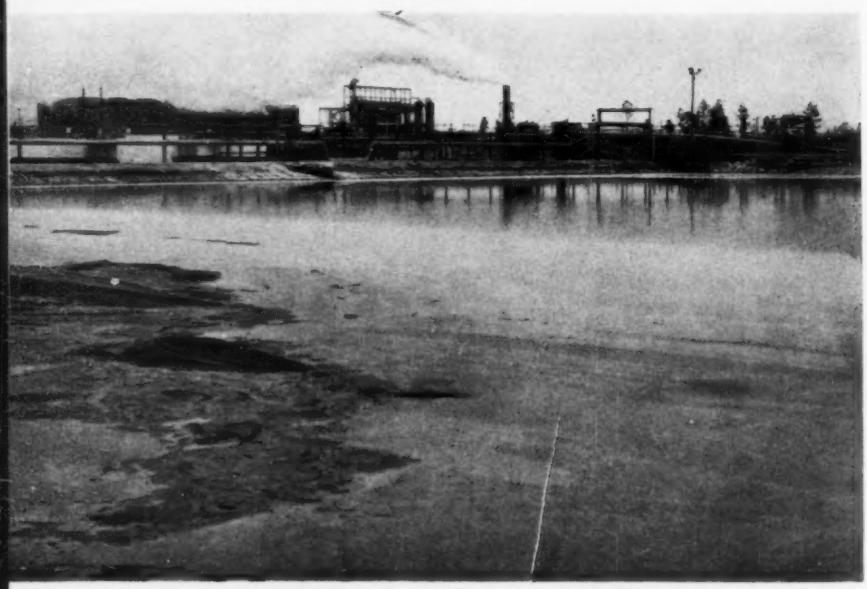


Chemstrand's settling basins—part of a gold medal pollution-control.

Pollution Action Picks Up

New evidence that the growing problems of air and water pollution are getting better-directed attention throughout the country turns up in CHEMICAL WEEK**'s latest survey of state and municipal action (see also p. 47).**

For the chemical industry, the new emphasis has lately meant recognition of the industry's current anti-pollution efforts, plus commendation for its preparations for future problems.

Case in point is the action of Florida's state conservationists, who last week publicly gave praise—and a gold medal—to Chemstrand Corp.'s Pensacola nylon plant for its waste disposal program.

Chemstrand's system handles tons of waste from its nylon production, processing and inactivating it and releasing it into the Escambia River. The disposal plant, valued at "several million dollars," was made a part of the initial construction. In it, the combustible wastes are burned in a submerged chamber fired with commercial natural gas, while other organic wastes are broken down by bacterial action. Storage and dilution ponds (*see picture*), coupled with regular sampling, fill out a program Florida cites as exemplary.

Elsewhere in Florida, however, a state health official recently urged strong action be taken to protect the state's water and air, warning that pollution will become a bigger problem in the next 10 years. And Gov. Leroy Collins has ordered a special study of the long-standing air-pollution problem between citrus growers and the phosphate industry. The state has no smog problem and the governor hopes it can "benefit from California's experience and avoid mistakes."

Sun in California: And California's experience, to a large extent, is the experience of Los Angeles County, which for years has had the most serious smog problem in the nation. Currently, the county is making a detailed attack on the problem through its Air Pollution Control District and state health authorities. Gov. Edmund Brown has called a special session of the legislature to establish laws that would incorporate standards and preventive measures now being drawn up for auto exhaust irritation and industrial pollution.

The chemical industry is one of several in the state that have been praised for the way they have met the challenge of pollution, and new restrictions will probably be aimed mostly at the motorist. CPI firms, especially oil refineries, are no longer on the list of offenders and Kaiser Steel Corp.'s plant, outside Los Angeles, was exonerated this week from being a contributing factor to the city's smog. Pollution "controls instituted by the company" were cited as determinants.

Other Steps Taken: Reports from other states and cities also show stepped-up action against pollution.

In Cincinnati, the Air Pollution Control League reports that it has won a significant battle with air pollution, with a 57% reduction in sootfall over the past 10 years. The association expects to step up its efforts; "As soon as we catch up with old problems, technological process goes on and creates new ones."

Metropolitan Boston is now in the first stages of what could become a broad air-pollution program, necessitated by an estimated $20-million/-year damage (apart from human illness) caused by air pollution. Although motorists and some industrial sources have been singled out as chief offenders, other companies are being complimented for their work to control pollution. Says the Massachusetts Legislative Research Council, which is studying legislation in the field: "Expensive efforts are being made by some progressive corporations to reduce their pollution."

In Nashville, Tenn., the first report of a $250,000 federal government air pollution survey of the area is expected in May. The survey, termed by a U.S. Public Health official as the "most comprehensive survey of its type ever undertaken" is expected to guide health authorities throughout the country. The report will be presented for the first time at the National Air Pollution Conference, to begin May 21, in Cincinnati.

Water Pollution: Many states are now studying water-pollution control bills, preparing recommendations, or setting up investigating committees. Included are Colorado, Kansas, Michigan, Missouri, New York, Ohio, Utah, Virginia and West Virginia.

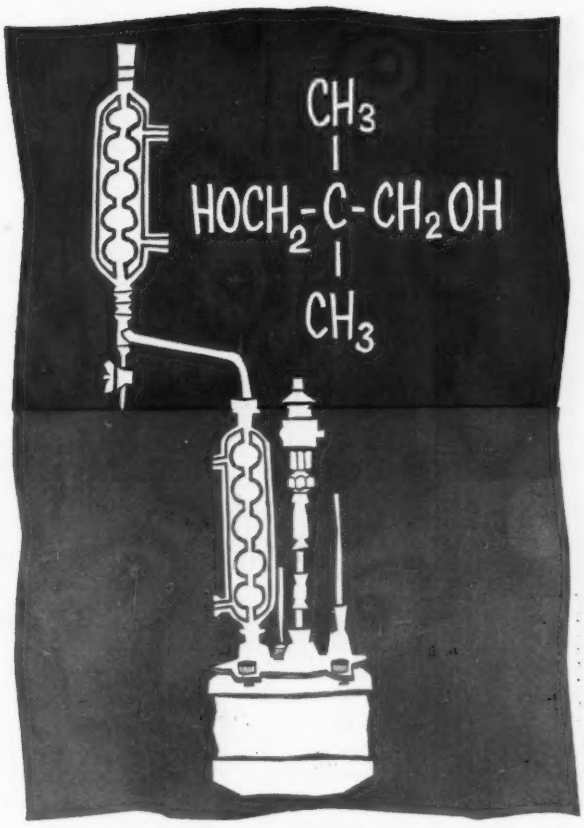
For the moment, however, federal action on water pollution seems unlikely. With the President's recent veto of the water-pollution bill, chances are only slight that any new bill, even one based on low federal expenditures, will be forthcoming. In the meantime, look for increased state and municipal actions to fill in the gap left unfilled by federal action.

NEOPENTYL GLYCOL POLYESTERS

Report from Eastman research

direct polyesterification on commercial scale now practical

derivatives noted for resistance to heat, water and sunlight



Direct polyesterification reactions of neopentyl glycol with dibasic acids have been under intensive study at Eastman's Development Laboratories for more than a year.

Results of this work show that the long reaction period normally associated with the preparation of neopentyl glycol polyesters may be shortened considerably through use of the proper metallic catalyst system.

The study demonstrates, too, that the problems of side reactions, color formation and polyester cracking, which attend lengthy reaction periods at high temperatures, are minimized through shorter reaction times.

A report on the nature of the catalyst evaluated and the procedures and techniques employed is available upon request.

Interest in polyesters based on neopentyl glycol stems from the stability characteristics it possesses and, in turn, imparts to its derivatives.

These stability characteristics are attributed to the compact, symmetrical molecular configuration of neopentyl glycol, and, in particular, to the presence of the two methyl groups on the central carbon atom.

For example, when neopentyl glycol is condensed with a dibasic acid it results in an easy-processing plasticizer of moderate molecular weight that exhibits permanence properties equal or superior to those of polymeric plasticizers of higher molecular weights.

Eastman offers such a product in its polymeric plasticizer NP-10.

Certain hydroxy-terminated polyesters of neopentyl glycol show promise in the manufacture of both rigid and flexible polyurethane foams.

These foams feature better tensile properties and improved resistance to sunlight and heat.

Unsaturated polyester resins made with neopentyl glycol can be formulated to meet an extended range of desirable mechanical requirements.

The electrical properties of several of these suggest their use in insulating varnishes.

Other polyesters made with neopentyl glycol, because of their hydrolytic stability, may be useful as water-soluble resins.

Among other derivatives of neopentyl glycol that warrant investigation are unsaturated polyester resins for cross linking with styrene; monoesters through diester interchange with neopentyl glycol for hydraulic fluids; and diesters for lube oil additives and for synthesis of specialized lubricants.

A copy of the technical data report describing this study as well as samples of neopentyl glycol may be obtained through your Eastman Chemical sales office or from Eastman Chemical Products, Inc., Chemicals Division, Kingsport, Tennessee.

Eastman
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SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tenn.; Atlanta; Chicago; Cincinnati; Cleveland; Detroit; Framingham, Mass.; Greensboro, North Carolina; Houston; New York City; Philadelphia; St. Louis. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

LABOR

Election Petitions: At the Atomic Energy Commission's Savannah River plant, operated by Du Pont, an AFL-CIO union, the Savannah River Atomic Metals Trades Council, has petitioned the National Labor Relations Board for a representation election. SRAMTC seeks to represent about 3,000 hourly workers, including production operators, maintenance mechanics and some service employees. Employees there have turned down unions in four previous elections, the most recent in '58.

At another AEC plant, operated by Dow Chemical Co. at Rocky Flats, Colo., District 50, United Mine Workers, has petitioned NLRB for an election. (District 50 now represents workers at five other Dow plants.) Currently, some 1,100 workers at the Rocky Flats plant are represented by Denver Metal Trades Council, AFL-CIO, covering 21 locals at the plant. The Metals Trades Council is charging District 50 with "raiding," argues that the move has been made possible by passage of the Landrum-Griffin Labor Management Act, which exempted District 50 from signing non-Communist affidavits in connection with government work. The current Metal Trades contract expires May 16, '60.

At Du Pont's Belle Works, near Charleston, W. Va., District 50 and Oil, Chemical & Atomic Workers were the final entries, along with no union, on ballots for a representation election to have been held late last week. Some 2,200 workers were expected to vote.

•

Auto Plans: First rumbles are coming out of Detroit on what to expect from AFL-CIO Vice-President Walter Reuther and his bellwether United Automobile Workers in their next contract negotiations. As expected, the union will renew its demand for profit sharing, a demand Reuther has been using as a lever to pry open the door to wage and pension increases.

•

Shell Dispute: A federal conciliation officer has been appointed in a wage dispute between Shell Oil of Canada, Ltd., and Oil, Chemical & Atomic Workers International Union. Meetings will be held in Vancouver, B.C., although no date had been set for them up to last week. The union is seeking a 24¢/hour wage increase across the board, while Shell seeks to hold the line. If the conciliation officer is unsuccessful, a three-man conciliation board will be set up to recommend a solution.

•

Merger: Another step toward federation of still-separate state governing councils of the AFL and the CIO has been taken with the approval by AFL-CIO President George Meany of a constitution for Ohio's state labor groups. Since merger of Ohio's 65,000 AFL members and 37,000 CIO members must await action by each municipal group, statewide merger is far from realization.

LEGAL

Patent Case: The U.S. district court of northern California has awarded an undisclosed amount of damages to Switzer Brothers, Inc. (Cleveland), maker of fluorescent pigments, following a ruling that the firm's patent (2,809,954) have been infringed by Radiant Color Co. (Oakland, Calif). The court issued a permanent injunction against Radiant that prevents it from producing, unless under license from Switzer, any fluorescent pigments using methods disclosed in Switzer's patent. Radiant plans to appeal the decision.

Price Quiz: Threats of a price-fixing probe are being aired in the Watertown, N.Y., area, after eight chemical companies submitted identical bids for supplying anhydrous ammonia to the city. The contract was awarded to Pennsalt Chemicals Corp., which made an alternative bid of 18¢/lb. — 2¢ under the other, uniform bids — provided it could deliver the material simultaneously with liquid chlorine it sells for use in the city's water system.

Another price probe is currently under way at Binghamton, N.Y., as the result of questioned bidding on municipal chlorine contracts.

•

Noise Suit: A group of residents with homes near a plant of the Louisville Refining Co. (Louisville, Ky.) are suing the company on charges that their property has been devalued by noise from the plant. The plaintiffs, who own about 15 tracts, are seeking a total of $48,000 damages, claiming that the noises interfere with the "quiet and reasonable" use of their property.

•

Property Disposal: The Diamond Crystal Salt Co. has agreed to divest itself of property at Seneca Lake, N. Y., acquired when it merged in '57 with Jefferson Island Salt Co. Diamond has signed a consent decree calling for the divestiture and also requiring that Diamond make available to other producers 30% of the rock salt mined at its plant at Jefferson Island, La., acquired from Jefferson Island Salt. Moreover, Diamond cannot acquire an interest in any producer or distributor of salt for 10 years. After that it still must give the Federal Trade Commission advance notice of a proposed merger. The order settled a 14-month-old case in which FTC charged that the merger might lessen competition or tend to create a monopoly.

KEY CHANGES

James M. Gavin (Lt. Gen., USA, Ret.) to president, Arthur D. Little, Inc. (Cambridge, Mass.).

George L. Varnes to president, Elanco Products Co., new subsidiary of Eli Lilly and Co. (Indianapolis).

Harold J. Berry to board of directors, and **Robert B. Armstrong** to treasurer, American Enka Corp. (New York).

S. K. Derderian to board of directors, Metal Hydrides, Inc. (Beverly, Mass.).

Willard M. Bright to vice-president, research and development, Lever Brothers Co. (New York).

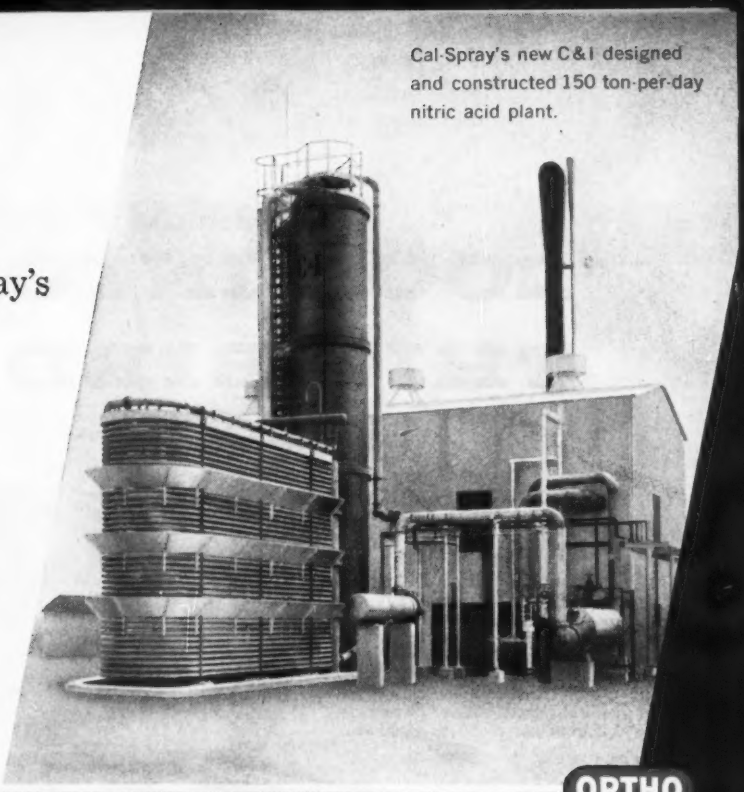
William G. Copeland to vice-president, Domestic Refining Dept., Texaco., Inc. (New York).

Chauncey Starr to president, **W. L. Sequeira, A. B. Martin, Sidney Siegal, J. J. Flaherty,** to vice-presidents, respectively, of administration, sales, technical, and planning, all of Atomics International Division, North American Aviation, Inc. (Canoga Park, Calif.).

Edward J. Mytkowicz to vice-president, operations, Hewitt Rubber Division, Hewitt-Robins, Inc. (Buffalo, N. Y.).

it's C&I again at Cal-Spray's

Kennewick Plant



Cal-Spray's new C&I designed and constructed 150 ton-per-day nitric acid plant.

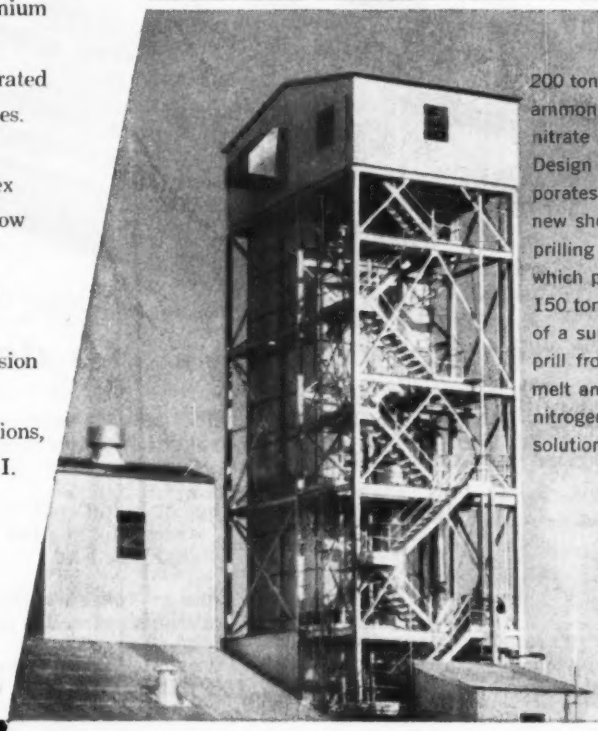
"*. . . beyond expectations*"

was the way Cal-Spray described their new nitric acid and ammonium nitrate facilities recently designed and constructed by C&I at Cal-Spray's Kennewick, Washington fertilizer plant. Both the nitric acid and ammonium nitrate plants went on stream according to schedule and operated in excess of their rated capacities.

Also under construction for Cal-Spray is their new complex fertilizer plant designed and now under construction by C&I. It is due to go on stream in the spring of 1960.

If you are considering expansion of present fertilizer facilities or are contemplating new locations, it will pay you to consult C&I. Representatives in principle cities of the world.

ORTHO



200 ton-per-day ammonium nitrate plant. Design incorporates C&I's new short prilling tower which produces 150 tons per day of a superior prill from a melt and nitrogen solutions.

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Pictured is an 18" long scale model with transparent bowl so you can look inside and see the screw conveyor rotating with the bowl but at slightly lower speed to effect continuous discharge of thoroughly deliquored solids. Separating forces range 30 to 3000 gs.

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thick feed slurries — as much as 50 to 60% solids

small volumes — as low as 0.25 cu. ft. per minute

big volumes — up to a ton or more of dried solids per minute

fume tight or pressurized operation — the Bird is readily available with case made vapor or pressure tight

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fine or coarse solids — from a fraction of a micron to a fraction of an inch

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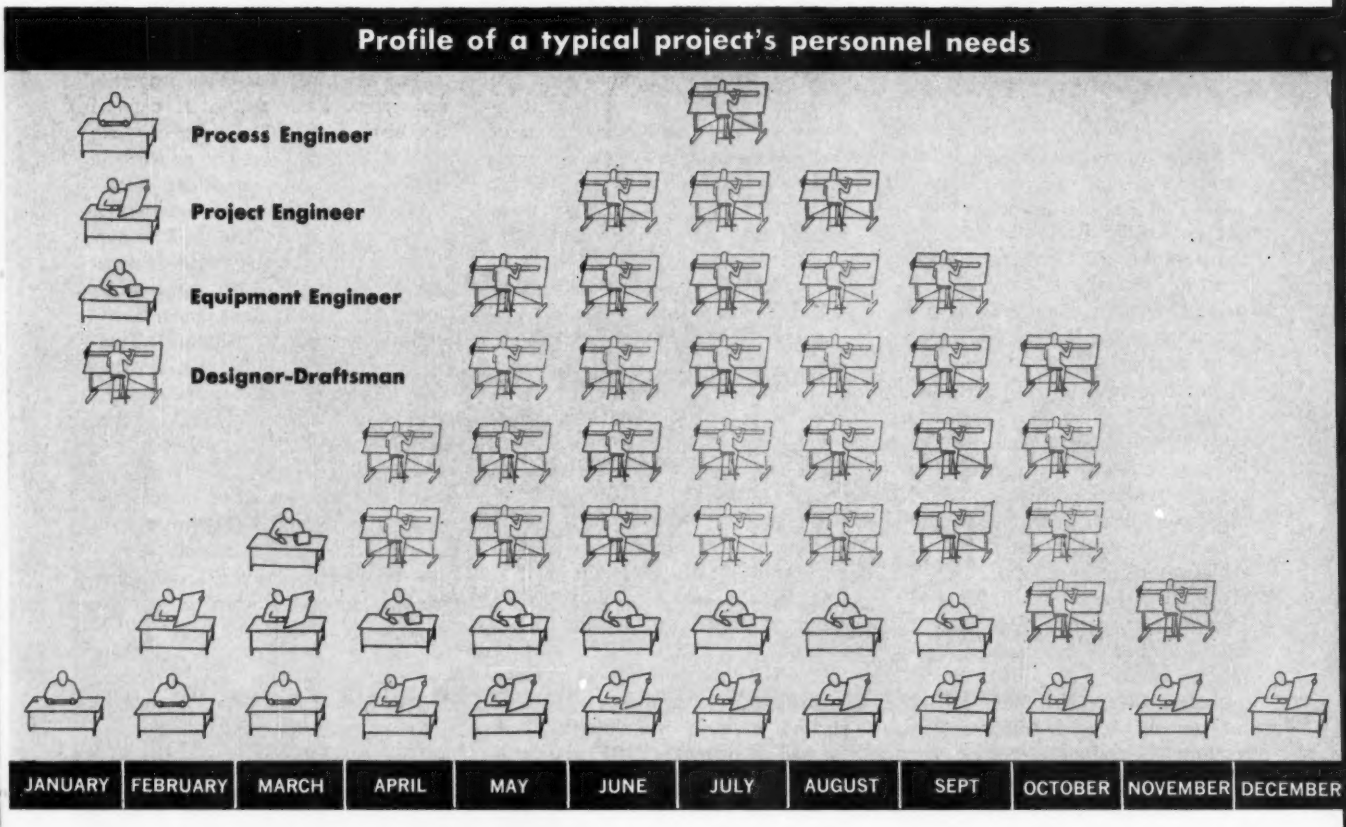


Rented Manpower Keeps Jobs on Schedule

Vital to the completion of the CIP's ambitious, $1.42-billion new-construtions program for '60 are experienced designers, which today are becoming an increasingly scarce commodity. Already, some firms are feeling the threat of a manpower squeeze, a threat that has brought new interest in the jobs that can be done by contract designer-draftsmen teams.

Clearly, the building boom means a reversal of the staff-trimming activities of the past year or so. But enlarging a company's staff won't be enough. Company engineering teams will have to be supplemented by those specialists who can apply their talents in electrical, piping, heating, and other engineering to almost any industry —the CPI, if it pays well enough. These specialists are currently working in industries, such as ship, aircraft and civil design.

Journeymen Engineers: To much of the chemical industry, indirectly employing "journeymen engineers" is nothing new. In the last few years, when pension plans and similar employee benefits have virtually become mandatory as bonuses to attract talent, such men—who prefer high, short-term pay to security—have become vital to the realization of plant expansions in many cases. But, as CHEMICAL WEEK's nationwide survey points up, there are still some companies that aren't aware of the savings that can be realized by using the journeyman-engineers, nor have those companies that have employed them fully exploited the potential of these men.

Estimates are that new plants now scheduled will provide a full year's work for 17,000 engineers—2,000 more than were needed last year. And should all new design work hit peak manpower requirements at the same time, it will mean a real pinch on skilled personnel.

When is this peak hit? As all experienced design engineers know, it comes after the material balances and the operating temperatures and pressures are worked out from pilot studies; after the reaction vessels, heat exchangers and similar equipment have been specified; after the project engineer has coordinated all data; and after dimensions, equipment and materials of construction have been decided upon.

It comes when the fabrication drawings have to be made; when pipe sizes, valving, layout, and instrument hookups are settled, but must be put on complete blueprints, along with the myriad of other new-building basics such as foundations, plumbing, and lighting arrangement.

When this time comes, a design begun by two or three engineers is

in the hands of perhaps 60 men. On a tight schedule—12 months for the full job—this 60-man staff may be working together for two or three months. Then, as construction begins and hits top speed, the design staff dwindles again to less than a half dozen.

Serving Many Industries: Providing designers to meet peak requirements, and withdrawing them when they're not needed, is the job at which designing-drafting jobbers excel.

Such jobbers can keep a sizable staff of versatile engineers—ready to design the piping, wiring, foundations, instrument layout, etc., for any type of construction.

Because they can save a chemical plant the woes of finding, breaking in—and letting go—experienced talent, the designer-drafting contractors are in a position to command a premium that allows them to pay their staffs as much as 20-30% over the money they would on a full-time job. Despite that premium, one company says it saves 20% on the cost of getting the work done by its own team.

Savings can be multiplied by skillful use of designer-draftsmen contractors. The consensus of some chemical companies (e.g., American Cyanamid, Du Pont, The Fluor Corp., W. R. Grace, Jacobs Engineering, Socony Mobil, Standard Oil of California, Union Carbide) suggests these ways of getting the most out of your job shops:

- Use jobbers on confidential design work; because the work's widely spread, rented designers will not likely carry away design secrets.
- Test the quality of the jobber's men before you agree to take them on (via examination or a design trial), or require your contractor to do similar sifting, testing.
- Don't figure on providing a guiding cadre of more than 15% of your own men; also re-examine whether your own staff is not basically big enough for the jobs you have in mind. Send your men to the jobber's office to do the job, or bring the jobber's staff into your own plant —either way works well.
- Provide engineering supervisors who can detail design procedures and organization. Chances are, your contractor will readily adapt to fit your procedures.
- Don't confuse the services of a job shop with those of an engineering contractor. Job shops serve as labor pools only, while engineering contractors provide a specialized design organization as well.
- Get your work moving as fast as possible. Inflated, short-term manpower demands have caused some of the severest basic problems in proving a steady crop of new engineering talent. Delay in lining out work can mean costly delays in construction. Then, even the savings you realize by using designer-draftsmen won't be able to make up for losses.

Electron-Beam Payoff

A new tungsten-tantalum alloy, which the Stauffer-Temescal Corp. (Richmond, Calif.) is offering in commercial quantities this week, demonstrates the payoff possible from recent developments in electron-beam smelting (*CW, March 7, '59, p. 39*).

Previously, similar alloys were made by sintering or electric-arc furnaces. Sintered bars 2-3 ft. long and 1-2 in. in diameter were made by cold-pressing them in a steel mold at 10-30 tons/sq. in., sintering them for half an hour at 1200 F, and treating them by reheating with an electric current passed through the bar; cast bars were formed by fusing alloys at 3100-3800 F using an electric arc.

However, neither of these methods has produced an alloy of the desired purity; and the price of the new alloy ($45/lb. in ingots and $90/lb. in sheets) is competitive with those produced by the older methods.

In the electron-beam process, a 90% tantalum-10% tungsten mixture of pure metallic powders is fed to the melting chamber of the furnace. Here they are hit by a beam of electrons fired from a 20,000-volt potential and directed through the center of an electric coil. The powders, heated by the beam to about 6000 F, fuse. They're then tapped into a cold mold, and formed into a semipurified ingot about 4 in. in diameter. After two subsequent purification meltings, the alloy is finally cast into an ingot 5 in. in diameter by 42 in. long.

The new alloy has been tailored for high-temperature work according to two principles long directing STC research: to get alloys that are (1) susceptible to forging, rolling, and wire-drawing by conventional steel-working equipment, and (2) ductile and impact resistant at room temperature after welding or otherwise recrystallizing.

The new alloy has these properties and more, STC claims. It can be hot worked at 2000 F, cold worked, welded with an inert arc or electron beam, and readily machined; moreover, it is as strong as tungsten at temperatures up to 5100 F. It is particularly useful where welded structures are submitted to static loads above 2500 F or impact and tensile loads at ambient temperatures. Typical applications of the new alloy:

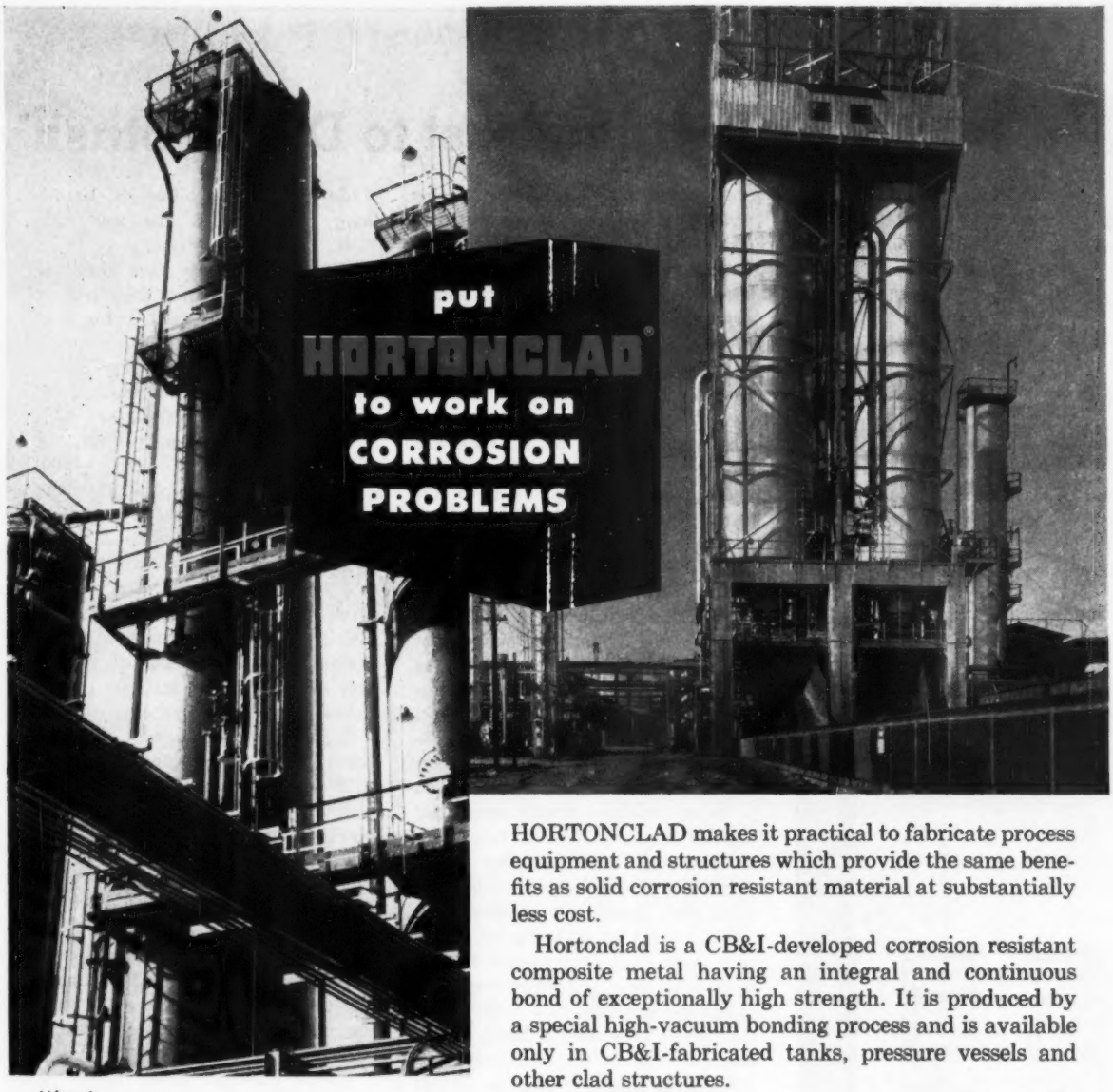
- Chamber, nozzle, and flare extension of an uncooled liquid-fuel rocket engine.
- Leading edges of ultrahigh-speed aircraft, where it must withstand intermittent high temperatures as well as severe impact loads.
- Flame barriers, nozzles of solid-fuel rocket engines, which must withstand thermal shock.

Nuclear Fuel Job

Private industry has landed a new nuclear fuel-fabrication job—its first chance at significant production of uranium-233. W. R. Grace & Co.'s Davison Chemical Division was the successful bidder and will process U-233 into fuel for the Advanced Epithermal Thorium Reactor (AETR) critical assembly. Atomics International Division of North American Aviation Corp. is the prime contractor; the reactor is now being built at Canoga Park, Calif., for Southwest Atomic Energy Associates.

Although the contract calls for fabrication of only 25 kilograms of U-233, the job makes up in complexity what it lacks in size. Material will be received in 2-kg. shipments, each of which must be converted into oxide, made into 1,200 aluminum platelets and shipped within three days. Unlike the more conventional thorium and uranium oxide fuels Davison has processed at its Erwin, Tenn., plant, (*CW, March 8, '58, p. 44*) U-233 presents a problem—it greatly increases in radioactivity after it's fabricated.

In addition to supplying a variety of fuel materials, Davison hopes to add spent-fuel reprocessing to its growing list of commercial nuclear interests.



(Above)

ABSORBER TOWER at a Louisiana chemical company has stainless steel Hortonclad shell. Thickness of backing and cladding is 1¼ inches.

(Right above)

COKING CHAMBER at a Kansas refinery uses 405 stainless steel Hortonclad backed by A205 Grade A moly steel.

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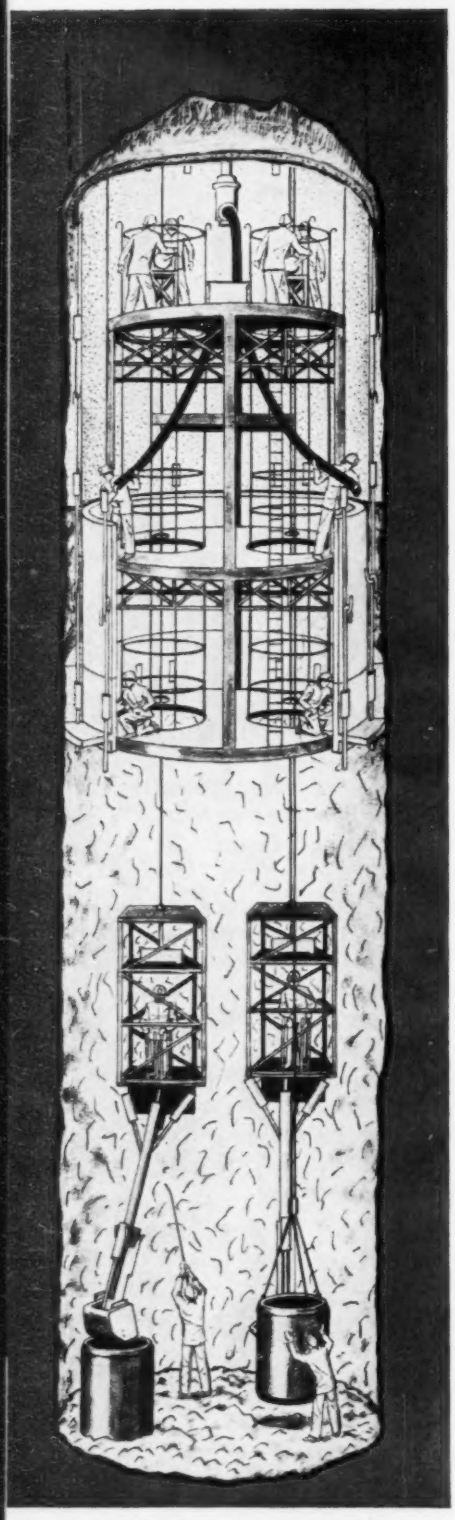

Galloway stage combines shaft-sinking and lining operations at IMC's deep potash mines.

Digging Fast to Deep Potash

At Esterhazy, Saskatchewan, this week, International Minerals & Chemical Corp. is readying a new modification of an old mining device to speed the sinking of a shaft to potash deposits some 3,000 ft. below the surface.

Key to faster shaft construction is basically a Galloway stage (*see picture, left*), which permits the simultaneous mucking of blasted rock, the setting of forms and the pouring of concrete shaft lining. Cost of the unit: $200,000; estimated savings: 10% lower digging costs; six to nine months' shorter sinking schedule.

The Galloway stage got IMC's nod because the Saskatchewan operations involve several mining problems not commonly encountered in shallower potash deposits. The Canadian ores lie about 3,100 ft. below the surface; the shaft must pass through a 250-ft.-thick zone of sand and water-bearing strata, and water seepage has been a severe problem. Besides complicating IMC's mining, it forced Potash Co. of America, Ltd., to suspend operations at a nearby mine until its concrete shaft lining can be sealed off.

IMC didn't hit on using the Galloway stage until conventional sinking operations were well under way. The device was suggested by a project engineer who had worked in South Africa where Galloways are commonly used for sinking shafts as deep as 10,000 ft. IMC's engineering management decided to use it for operations below the troublesome water-bearing strata, on which it was forced to try still another mining technique unusual in North America.

Freezing and Tubbing: IMC employed conventional digging methods down to the 1,200-ft. level, then attempted to stabilize the water zone with cement and chemical grouting. When this technique wasn't satisfactory, the company switched to a combination of freezing and tubbing. The freezing technique is conventional, is used in many areas where ground waters cannot be sealed off by simpler methods (*CW, June 4, '55, p. 70*). The tubbing technique was imported from Germany, involves the sinking of 5-ft.-high, 15-ft.-diameter rings of 18-in.-thick iron to form a 300-ft.-long tube through the wet zone (*CW, Feb. 27, p. 98*).

When the Galloway stage takes over the digging operations, shaft sinking is expected to proceed more than twice as fast as originally planned. Here's how the triple-decker equipment handles all of the construction jobs simultaneously:

At the start of each shift, the double-duty stage is lowered to the bottom of the lined portion of the shaft. Clamshell muckers suspended below the stage scoop blast-loosened rock into hoist buckets, which carry it to the surface, while men on the level above set up concrete forms for pouring a section of the lining. The bottom half of each section is poured and allowed to set first, so that it forms a foundation for the top section.

A major modification of the Galloway was the suspension of the clamshell muckers from the surface hoist, instead of from the stage, as is done on the South African systems. In this way, IMC halved the weight of the stage, doubled the speed of hoisting filled buckets out of the shaft.

At the end of each shift, the stage is raised about 60 ft. during blasting operations at the bottom of the hole. The lining and mucking work is then resumed to complete one sinking cycle.

Earlier Startup: Aside from the 10% reduction in shaft construction costs, the biggest economic advantage IMC expects from the Galloway stage is the earlier startup of potash production. By lopping six to nine months off the shaft-sinking schedule, the company reduces the fixed overhead on such items as contractor equipment marshaled in the area during construction. And the added six to nine months of actual potash production moves up the start of the plant's payout period, provides return on investment that much sooner.

IMC is also taking into account such intangibles as the prestige and marketing advantage of being the first company to market Saskatchewan potash on a regular basis. (PCA reportedly had started production before the water seepage forced shut-

Acetaldehyde Ammonia
Acetophenone
Acetyl Chloride
Adipoyl Chloride
Anisic Aldehyde
Anisyl Acetone
Anisyl Alcohol Tech.
Anisyl Chloride
Anisyl Cyanide
Azelaoyl Chloride
Benzalacetophenone
Benzhydrol
Benzhydrylamine
Benzhydryl Chloride
Benzophenone Tech.
Benzyl Alcohol Tech.
Benzyl Cyanide
Butyroyl Chloride
n-Caproic Acid
Caproyl Chloride
Capryloyl Chloride
p-Chlorbenzhydrol
p-Chlorbenzhydryl Chloride
p-Chlorbenzophenone
p-Chlorbenzyl Cyanide
Cinnamoyl Chloride
Dibenzyl Ether
Dicyclohexyl Carbinol
Dicyclohexyl Ketone

I N T E R M E D I A T E S

p,p'-Dimethoxybenzophenone
Diphenyl Acetone (unsym)
Diphenyl Methane
Ethyl Formate Tech.
Ethyl Phenylacetate
beta Ionone
Isobutyroyl Chloride
Isovaleric Acid
Isovaleroyl Chloride
Lauroyl Chloride
p-Methoxy Phenylacetic Acid
Methyl Heptenone
Methyl Phenylacetate
Myristoyl Chloride
Oleoyl Chloride
Palmitoyl Chloride
Pelargonyl Chloride
Phenylacetic Acid
Phenylacetone
Phenylacetyl Chloride
Phenyl Propyl Alcohol
Phenyl Propyl Chloride
Potassium Phenylacetate
Propionyl Chloride
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2nd Mortgage Loan, Pennsylvania Industrial Development Authority.	*30%*
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ENGINEERING

down of the plant, but it's not known how soon this operation will be resumed.)

The company hopes to have the Galloway unit in operation around September. Completion date on the first shaft: June '61. The mining device will then be shifted to another site and used for the entire sinking of a second shaft. IMC plans to store the unit for future use, feels it will be economically attractive for almost any mining operations requiring relatively deep shafts.

PROCESSES

Pure Pigments: A new method of removing iron traces from lead salts for paint pigments is described in the Russian journal *Chimitscheskaja promuschlennost*. Key: iron forms insoluble complexes with salicylic acid. Technical-grade lead oxide is dissolved in the salt-forming acid at about 175 F, with vigorous stirring; the solution is diluted to a specific gravity of around 1.2 with water (iron in this solution should be about 0.003%); 2% activated carbon is mixed with this solution for 15 minutes for preliminary purification; then one part of saturated salicylic acid solution is mixed with each five parts of the salt solution and the mixture is filtered. Final products will contain less than 0.0000051% iron.

•

Cobalt Cuts Corrosion: Experiments at the Centre National de Recherches Metallurgiques (Liege, Belgium) have shown that the resistance of 18-8-type stainless steels to corrosion by oxidizing acids is increased by additions of cobalt. Steels containing 17-27% chromium, 0.2-9.5% nickel, and 1.5-10% cobalt were investigated. Reprints of the research report may be obtained from Battelle Memorial Institute (Columbus, O.).

•

Improved Filter Beds: General Electric scientists at the Hanford, Wash., atomic reactor installation have been able to double the throughput of the filter beds that purify Columbia River water before it is used as a cooling agent. The higher flow-rates were obtained by changing the bed thicknesses—from 20 in. of sized anthracite coal, 10 in. of gravel and 10 in. of precoated sand, to 24-27 in. of anthracite, 10 in. of gravel, and 3-6 in. of sand conditioned by adding the precoat chemicals to the water before it enters the filter beds. Before filtering, the river water is treated with coagulant and settled.

•

Polyethylene Licenses: General Electric is now offering nonexclusive licenses on its patented (U. S. 2,888,-424) processing techniques for the manufacture of filled, chemically cross-linked polyethylene. GE is also authorized to grant licensees similar rights to processes for unfilled, cross-linked polyethylene covered by a Hercules patent (U. S. 2,826,570). These products are described as "an improved class of materials" with excellent high-temperature tensile strength. Among the leading commercial applications: hot-strength films and tapes; molded industrial parts; wire and cable insulation; piping.

•

Acid Recovery: Ionics, Inc. (Cambridge, Mass.) has developed a new use for its electric membrane process in the recovery of spent acid from the iron and steel industry. Ionics' Vice-President Walter Judah estimates the new system would save $500,000/year in acid and waste disposal charges at a typical steel plant using 50 tons/day of sulfuric acid for pickling operations. Total capital investment for a recovery plant for an operation of this size would be about $700,000. Ionics is currently negotiating license agreements for the European "Common Market" countries, feels that process may be justifiable solely on the basis of eliminating water pollution problems.

•

Molybdenum Tubes: Molybdenum tubes and cylinders for use in missiles, rockets and space vehicles can now be spun-cast with a technique developed by the Bureau of Mines' Metallurgy Research Center (Albany, Ore.). The procedure, which consists of vacuum arc-melting above 4750 F and casting into rotating graphite-lined molds, is believed adaptable to commercial-scale production. More complex shapes, such as pipe tees, were also cast into stationary molds; but these did not have the spun-cast tubes' surface appearance or internal soundness. Full details of the technique are described in Report of Investigations 5555, titled "Molybdenum Casting Development."

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U.S.I. CHEMICAL NEWS

March 19 ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1960

Consumption of Heavy Chemicals Grows with U.S. Living Standard

According to statistics assembled recently by the MCA, every man, woman and child in this country in 1958 used over 46 pounds of caustic soda, 182 pounds of sulfuric acid, 41 pounds of chlorine and 44 pounds of ammonia. Per capita consumption of these basic heavy chemicals has been growing steadily since 1939, when the comparable figures were 16, 73.7, 7.9 and 7.3 pounds respectively.

MCA says that this growing consumption is a broad indication of the increasingly important part chemicals are playing in the nation's material well-being. Of course, these chemicals are not seen by the public in the form in which they are produced. But they are used in the manufacture of thousands of everyday items such as soaps and detergents, wearing apparel, paper, gasoline, and plastic articles.

Polyethylene Production In 1959 Estimated at Over a Billion Pounds

In 1959, for the first time in the history of the plastics industry, the one billion pound production mark was passed, and by two materials—polyethylene and vinyl. The Society of the Plastics Industry estimates that production of polyethylene was 1.2 billion pounds, of vinyl 1.1 billion pounds. Estimated production of either of these two raw materials in 1959 exceeded the total production of all basic plastic raw materials as recently as 1946, when only 994,277,000 pounds of plastic raw materials were produced.

As a manufacturer of polyethylene, U.S.I. has been predicting for some time that this material would be the country's first billion-pound plastic. By the end of 1959, the company's own polyethylene production capacity had reached 175 million pounds, with 125 million pounds of additional capacity scheduled to come onstream in 1960. When expansions are complete, U.S.I. will have an overall production capacity of 300 million pounds annually, and will be the second largest among all polyethylene producers.

New Acetone Data Sheet Just Released By U.S.I.

Specifications, properties, shipping information and uses for acetone are listed in a new data sheet now available from U.S.I. The material is employed widely as a solvent—for cellulose acetate, vinyl resins, fats and waxes, acetylene gas and a host of other industrial products. Acetone is also used in the manufacture of drugs, dyes and plastics, in many other organic syntheses, and as a dewaxing agent for lubricating oils.

The new data sheet can be obtained from U.S.I. sales offices or from the New York office at 99 Park Avenue.

Unique U.S.I. Pilot Plant Supplies Vinegar Makers with Technical Data and Assistance

Ethyl Alcohol Supplier U.S.I. Has Been Operating Vinegar Test Generators Since 1932; Helps Customers with Problems, Studies Production Variables, Keeps Industry Informed.

One of the large uses for industrial ethyl alcohol is in the production of vinegar—an operation which consumes ten million gallons of ethyl alcohol annually. For years, U.S.I. has provided a complete technical service for this industry at a unique pilot plant devoted entirely to the study of vinegar manufacture from ethyl alcohol.

U.S.I. does not make vinegar now, but did make it as dilute acetic acid for chemical raw materials prior to World War II. Consequently, the company has a first hand knowledge of just what kind of help its customers need to turn out the best products most efficiently and economically. U.S.I. supplies this help in three forms: basic studies of the variables in vinegar manufacture; work on customer problems; and regularly published technical news letters to the industry.

Research on Vinegar Production

Over the years a group of specialists, with a highly trained staff, has operated U.S.I.'s battery of vinegar test generators in pursuit of knowledge on such considerations as: vinegar aroma and the constituents of the raw material which contribute to it; calculations of the conversion efficiency of generators; oxygen requirements; packings; heat production and control; nutrients; acid concentrations;

MORE

DL-*Methionine Used to Treat Chronic Peptic Ulcer*

In a 4½-year study reported recently, 54 patients with chronic peptic ulcer were treated orally with the essential sulfur amino acid, DL-methionine (3–6 grams/day) and good clinical results were obtained in 80% of the cases.

The patients treated were divided into two groups: those who received methionine preoperatively only, to see if their ulcers could be healed prior to surgery; and those who were given medical treatment with methionine to prevent or diminish the number of recurrences. Seventeen of 18 cases in the surgical group healed prior to surgery. Twenty-six of 36 cases in the medical group responded favorably. Of these, 23 with duodenal ulcers had long-term good results.

The clinical findings suggest that chronic ulcer patients undergo a kind of stress so as to lose sulfur-containing substances such as mucin. This metabolic loss can decrease resistance of the duodenal mucosa to autodigestion and lead to ulceration.

Dr. J. H. Mueller, of U.S.I.'s Cincinnati Research Laboratory, is shown putting an ethyl alcohol (SDA-35A) charge into a vinegar generator.

Dr. Mueller draws off vinegar sample from test generator in U.S.I.'s vinegar pilot plant at the Cincinnati Research Laboratory.

CONTINUED

Vinegar Pilot Plant

mineral content of waters effects of equipment; effect of alcohol denaturants; bacteriology of the process.

Vinegar News Letters

Since 1953, this research work has been reported to the vinegar industry through a series of news letters which have been issued on the average of four times a year. These news letters are comprehensive reports on matters of vital interest to the field. Not only do they concern themselves with data developed at the U.S.I. pilot plant, but they also present reviews of published data, patents and foreign developments. In 1958, one of these news letters gave a comprehensive report on happenings at the International Vinegar Conference.

Customer Service on Vinegar

U.S.I. customers come to this fully equipped, fully staffed vinegar pilot plant with their production problems. When a manufacturer's yield has dropped off, and he wants to determine the causes and correction, a U.S.I. technician from the research lab will call, when requested, and make a full examination of the problem. After studying similar conditions in the pilot generators U.S.I. can then recommend certain solutions to the problem.

This unique pilot operation was originally headquarters at Baltimore, Maryland, but was moved about a year ago to join other U.S.I. test facilities at the Central Research Laboratories at Cincinnati, Ohio. More complete information on its activities may be obtained from U.S.I., 99 Park Avenue, New York 16, N. Y., on request.

Recent Study Determines Rate at Which Undesirable Biuret Forms from Urea

The rate of biuret formation from urea under various conditions was determined in a recent study undertaken to help fertilizer formulators control the presence of this harmful chemical. Biuret, one of the main by-products obtained on heating urea, has a detrimental action on plants and leaves. It is therefore desirable to be able to estimate the rate of its formation from urea under manufacturing and shipping conditions.

The study, made by U. S. I.'s Roderick Shen and published in Agricultural & Food Chemistry, permitted determination of the constants of biuret formation from urea at different temperatures. By use of such constants, the rate of biuret formation from urea solutions at different concentrations can be calculated for any temperature. Results have been put in the form of tables and graphs. Further information may be obtained from U. S. I.

Sodium Reduction Route to Thorium Reported to Give Very High Purity Product

The U. S. Bureau of Mines has developed a new route to thorium which yields the metal at 99.8% purity, with an oxygen content of 200-500 ppm. The process utilizes sodium reduction of the chloride, which was one of the first techniques tried over a century ago when thorium was discovered. At that time, however, it was discarded because it produced a powder with over 3% oxygen content.

New technology on the effective application of alkali metals as reducing agents has brought the process back into use. The modern sodium reduction process not only yields a purer product than the 100-year-old version, but also gives a sponge rather than a powder. This cuts down on handling problems and fire hazard.

By the new method, thorium nitrate is converted to the oxalate with oxalic acid. The oxalate is then reacted with carbon tetrachloride to yield thorium tetrachloride, which is purified by distillation in nickel equipment.

Reaction of the chloride with metallic sodium is carried out in a titanium crucible under an inert atmosphere, by heating to 350-400°C. at the start and then raising the temperature to 850°C. When reaction is completed, the crucible is evacuated. Excess sodium and sodium chloride are distilled off at 900°C. under high vacuum, and the high-purity thorium sponge is recovered for vacuum arc melting to ingots.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

3,000 Assayed biochemicals for research are described in new reference guide. Sections cover amino acids, peptides, alkaloids, reagents, carbohydrates, enzymes, hormones, purines, pyrimidines, proteins, vitamins, other products. **No. 1570**

n-Butyl myristate (BUMYR) is subject of recent technical bulletin. Material is said to resemble low-viscosity natural oils but without their objectionable characteristics. Suggested for drugs, cosmetics, toiletries. **No. 1571**

Carbon-14 labeled compounds listed in new, 46-page catalog. Includes licensing information, purity methods, other pertinent data. Offers many license-exempt packages. Has special list of hydrocarbons. **No. 1572**

New atmospheric-particle counter now on market said to be designed for continuous monitoring of outdoor or indoor atmosphere. Includes strip-chart recorder, alarm system. Counting rate is 1,000 particles per minute. **No. 1573**

Molybdenum metal is discussed in new, illustrated brochure which includes general description, processing, properties, table of molybdenum products and their uses, wire conversion chart and resistance-temperature chart **No. 1574**

Thioacetamide as analytical reagent is subject of new technical booklet. Material used to precipitate metal sulfides by "precipitation from homogeneous solution." Avoids handling of hydrogen sulfide. Reaction mechanism discussed. **No. 1575**

Sodium-potassium alloys (NaK) and potassium covered in 8-page brochure now available. Details, chemistry, properties, and uses of NaK as heat exchanger fluid in atomic reactors or high temperature processes. **No. 1576**

Cationic chemicals as conditioners for hygroscopic salts and fertilizers are described in new booklet. Formulations, methods of application, recommended uses are included. Field test results with fertilizers also given. **No. 1577**

Detackifier for rubber, said to be widely used in Europe, now being made here in commercial quantities. Used as dip or spray solution. Coats uncured rubber stocks within stable film which prevents adhesion. **No. 1578**

Polyethylene bottle-cardboard carton pack now being used for reagent chemicals. Bottle cap is replaced by pour-spout cap plus tubing and clamp. Carton is inverted and package becomes dispenser. When empty, pack is disposable. **No. 1579**

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Technology
Newsletter

CHEMICAL WEEK
March 19, 1960

Dutch manufacturers want to sell equipment here, license U.S. devices for European sales. What U.S. companies have to gain: sales within the six-nation European Economic Community ("Common Market"), where tariff barriers have been proposed (*see also p. 21*). The Netherlands Trade Commission in New York points out that U.S. chemical companies building plants in Common Market countries can already buy a wide range of Dutch-designed equipment, heat exchangers, pumps and pipelines—even complete plants—for nitric and sulfuric acid, urea, fertilizers and petroleum products. The Dutch bid to sell equipment for plants in this country will face the growing ire of U.S. equipment makers regarding all imported equipment. For the time being, at least, the imported Dutch equipment may offer price advantages; over the long haul, advantages will probably be in equipment of specialized design such as mixers, crystallizers and dryers.

•

Irradiated polyethylene packaging film that shrinks when heated is being turned out by W. R. Grace & Co.'s Cryovac Division at Simpsonville, S.C. More than 1 million lbs. have been test sold (for wrapping meat and poultry at 3¢/1,000 sq. in.). Regular polyethylene sells for 2.7¢; cellophane, 2.7-3.3¢; Dow's saran, 4¢.

Called Cryovac Type L film, it's made by irradiating broad polyethylene tape, using a 2-mev. GE electron-beam generator, then stretching the tape biaxially. It features high clarity, high tensile strength (10,000 psi.). Patents on the process cover both high- and low-density polyethylene, polypropylene and various copolymers.

The new film is made from linear polyethylene, reflects Grace's research in tailoring polyolefins (*CW, Feb. 27, p. 76*).

•

Dow last week disclosed process plans for phenol production at its proposed 36-million-lbs./year plant in Kalama, Wash., due onstream in mid-'62. A two-stage process will be used, starting with the oxidation of toluene to benzoic acid, followed by a second oxidation step to convert the benzoic into phenol.

Leland Doan, manager of Dow's Western operations, points out that the absence of by-products is one of the attractions of its route—in the second oxidation step only phenol and recyclable benzoic are produced. This step: two moles of benzoic acid react in the presence of a copper catalyst, yield an ester, phenyl benzoate, which, when hydrolized, produces one mole of phenol and one mole of benzoic, which is recycled.

A licensing agreement between Dow and California Research Corp. is also involved, although neither company will discuss details.

However, both companies carried out simultaneous research and obtained patents on the benzoic oxidation process. CRC's patent (U.S. 2,766,294) and Dow's (U.S. 2,727,926) both describe a copper-catalyzed oxidation of benzoic; Dow also covered the use of certain promoters—salts, oxides or hydroxides of metals such as magnesium or cobalt—to increase yields. Conversions reported in the patent ranged from 68% to 86.6%.

Aside from "production economies" gained by minimized process waste treatment, Dow would also seem to have an edge on raw-materials cost. Benzene is currently quoted at 34¢/gal., toluene at 25¢/gal. However, in using toluene, the methyl group is chewed up and leaves the process as carbon dioxide; also, toluene is less dense. Assuming 100% conversion, toluene costs would be 17% cheaper. This, however, could be offset by differences in process efficiencies.

•

A new epoxy-base pipe-coating was unveiled this week by Minnesota Mining and Manufacturing Co. (St. Paul, Minn.). Dubbed Scotchkote, the corrosion-proofing resin is a fast-curing type (cures in 15 seconds), permits direct application to hot pipes as they emerge from fabricating equipment. Although Scotchkote costs more than asphalt coatings commonly used, 3M expects the cost differential will be partly offset by freight savings (epoxy coatings are lighter than asphalt) and reduced fabricating costs (high-speed automatic application can be integrated with existing pipe-making machinery).

•

Industrial fabrics are not included in the new Textile Fibers Identification Act, contrary to many earlier interpretations (*CW, Jan. 2, p. 41*). Point of confusion, which has drawn requests from some companies for specific interpretations by the Federal Trade Commission, is the manner in which Rule 45—"Exclusions from the Act"—is written. Section (a) states in part: ". . . the commission hereby excludes from the operation of the act: (1) All textile fiber products except: . . . [XVII] all fibers, yarns and fabrics (including narrow fabrics except packaging ribbons) . . ." The double negatives are confusing. However, Section (h) of the rule, which further defines "textile fiber products," seems to be the key that limits the act to household and apparel items rather than industrial fabrics such as filter cloth.

•

Latest bid for the synthetic jet-engine oil market is coming from Esso. A new oil, developed by Esso Research and Engineering Co. (New York), appears to have the best storage stability of any yet developed: it can be stored in tropical conditions for five years without deterioration. Esso claims one of its previously developed synthetic oils provided the bulk of '59 military requirements, is now being flight-tested for commercial jets. In developing the new oil, Esso researchers used petroleum (hydrocarbon) rather than natural-ester-derived (vegetable) materials, hence the "synthetic" tag.

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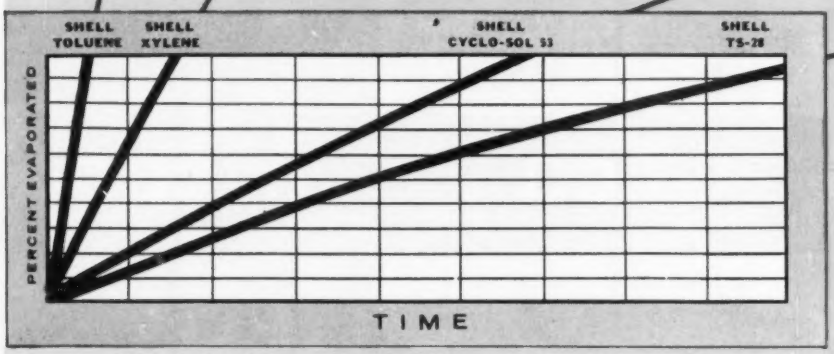

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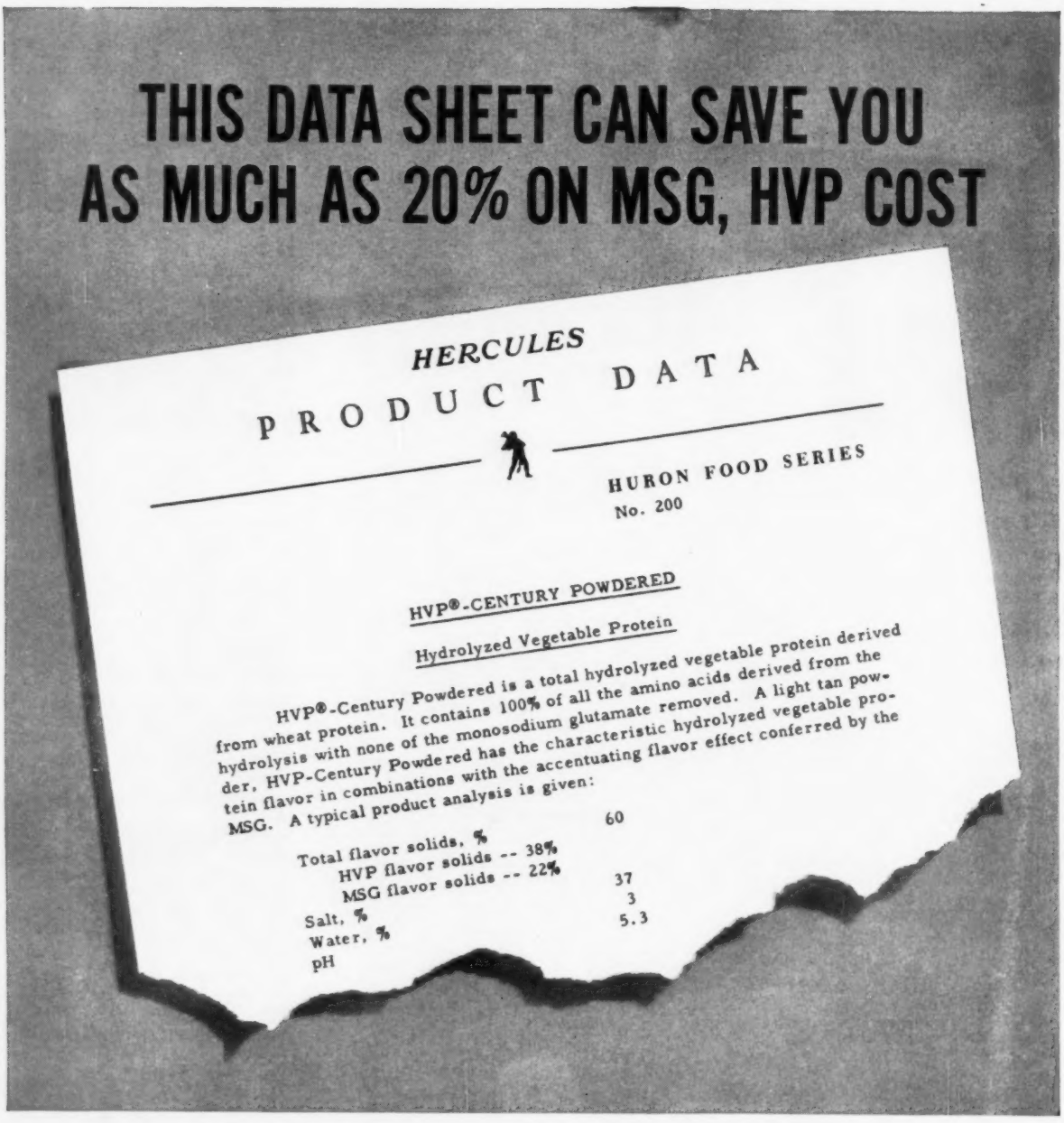
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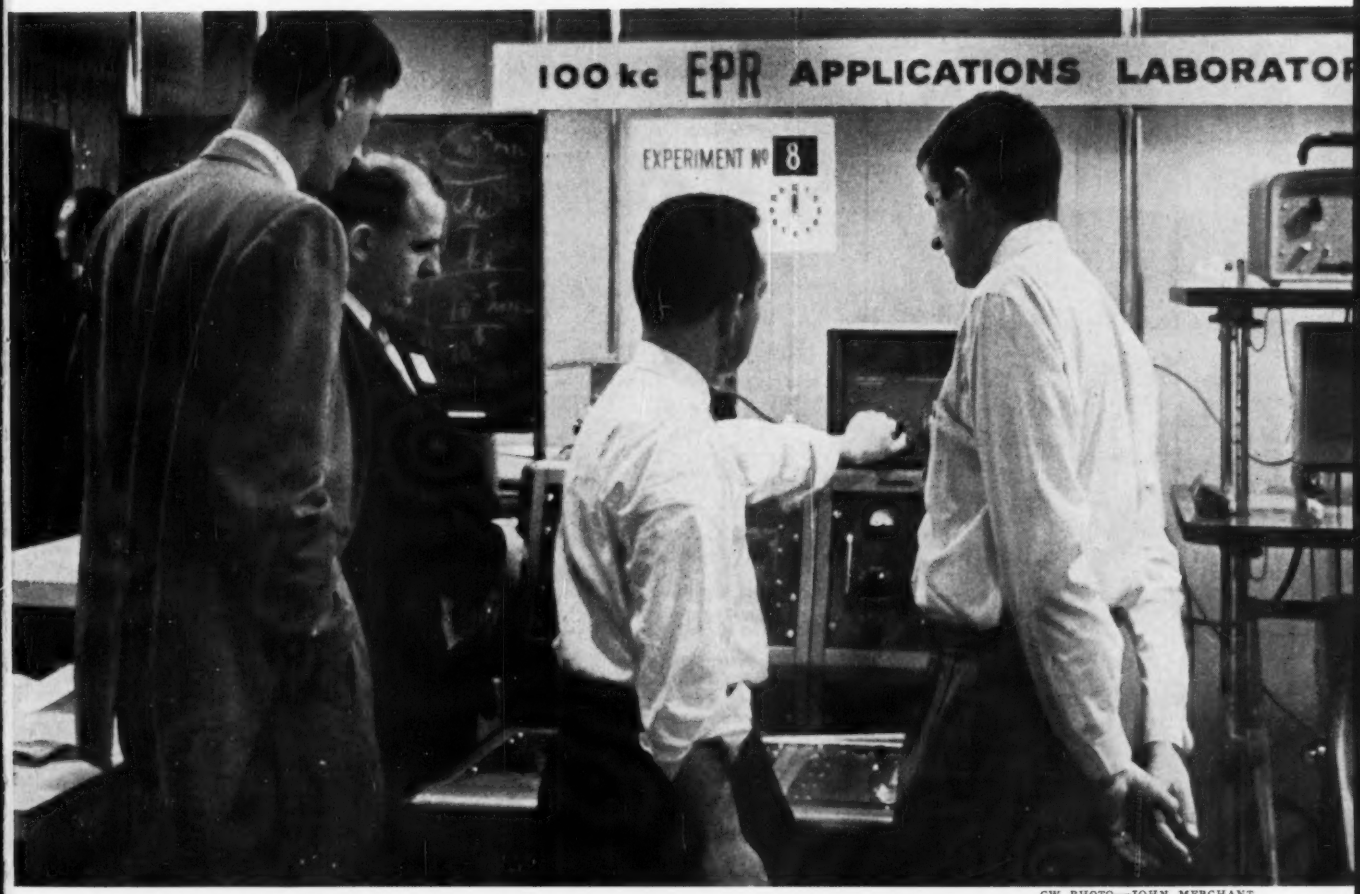

CW PHOTO—JOHN MERCHANT

Varian researcher shows visitors at trade show booth how the company's new analyzer solves problems.

Researchers Double as Part-Time Salesmen

The shirtsleeved research staffer shown above is doing an invaluable selling job for Varian Associates, Palo Alto, Calif., instrument manufacturer. The scene: the recent analytical apparatus show at Pittsburgh, Pa. During the five-day affair, the Varian team demonstrated how a company instrument solves actual laboratory problems. Theory: where clinching the sale calls for a good deal of technical know-how, researchers are often the best "salesmen."

Trade show activity is only one way in which *bona fide* researchers (excluding technical service and product development personnel) can be important to a company's marketing effort.

They also present technical papers centered on company products, address groups of potential customers, visit customers alone or with salesmen, brief marketing people on new products, write technical brochures and ad copy, attend new-product press conferences, pose for publicity and advertising pictures, and even have responsibility for initial promotion of new products.

Trade Showstopper: The Varian display was an operating applications laboratory centered around the company's $30,000 electron paramagnetic resonance (EPR) instrument. Of some 100 problems sent to the company in response to a mail survey, 9 or 10 of the best were gleaned for use at the show. The solutions—requiring about 3 hours each—were worked out right before the eyes of those attending the conference.

Response to this effort, tried by Varian for the first time, was very good, according to Martin Packard, head of research and development for the instrument division. However, the researchers get more than selling experience from this activity. The most important bonus is the direct customer contact, which gives the Varian people a better feeling for the needs, problems and preferences of their market.

Packard points out, however, that all members of the company's research staff are not required to do this type of work. Although one or two percent of the staff may spend nearly half their time working with customers, other researchers may have little inclination or ability in this direction. As Packard says, "Researchers are

Puzzled

over a pigment problem? an extender problem? a magnetic powder problem? let Williams assist you in solving it!

In all modesty, let us say that we are the largest manufacturer of our kind in the world. We make colors and pigments of the inorganic type—natural and synthetic—the naturals by processing selected ores and minerals, the synthetics by such chemical processes as precipitation and calcination.

Williams customer research and development facilities are the finest, so when you're puzzled over a problem using pigments, extenders, magnetic powders . . . let us know. We'll be glad to put our organization to work for you. Write, stating your problem . . . to Department 39, C. K. Williams & Co., 640 N. 13th St., Easton, Pennsylvania.

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CW PHOTO—DOUG KIRKLAND

Asarco researcher starts out to help a customer with a pure-metal problem.

hired primarily to do research, not to sell."

In other firms, researchers attend industrial and scientific shows as resource personnel. For instance, U.S. Industrial Chemicals Co. (New York) plans to staff a booth at the fall national meeting of the American Chemical Society with sodium experts from its Cincinnati research center. And General Mills' chemical division (Kankakee, Ill.) uses researchers behind "question bar" at the annual paint show. Both these cases demand the use of research personnel, because of the variety of technical questions that might be asked.

A similar, but less direct, technique is for researchers to make the rounds of technical meetings presenting papers on company products.

Seminar Approach: Researchers can also supply technical punch to private seminars. One of the most ambitious project of this type is the "road show" sponsored by General Mills. General Mills researchers tour cities giving seminars on company products. Audience: other researchers. Purpose: to get ideas for new applications, as well as to publicize the products.

The company's first effort—a four-city tour devoted to polyamide resins (*CW, Feb. 15, '58, p. 44*)—was so successful that another was held

● low sweetness ● soluble, uniform ● free flowing, anti-caking aid
● flavor-enhancing ● pigment-absorbing
● non-reacting with other ingredients ● fermentation agent
● bland, almost tasteless triturate

Lactose is an amazing sugar with unlimited uses. It can improve your present products and help you develop new ones. It can lower your costs, simplify your processing. New uses are being discovered for it every day.

Only Western can supply you with all forms of Lactose—five grades, ten granulations. Strict chemical and bacteriological specifications and a rigid quality control program assure highest quality.

Take a fresh look at the characteristics of Lactose. One of the grades or granulations may help solve a problem you are working on right now. For free samples and information, write our Technical Service, Department 20B. (Tell us the applications you are considering.)

Foremost lactose

WESTERN CONDENSING COMPANY

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World's Largest Producer of Lactose-Pure Milk Sugar

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in early '59 on fatty nitrogen products. A third (to cover both subjects and to hit new cities) is in the works. A company spokesman injects a note of caution, however, saying, "Unless you have a good story, you can wear out your welcome fast."

Another company that believes in road seminars is Nalco Chemical Co. (Chicago). It schedules two to four such meetings a year on its antifouling and corrosion-inhibiting materials. It has two on the docket for '60.

Researchers, invited to speak to outside organizations, can often work product information into their talks. When Merck & Co. (Rahway, N.J.) was introducing Diuril (chlorothiazide), Frederick Novello, who was a key figure in the original synthesis of the material, cited the new product in a talk on drug company research to the staff of a Philadelphia hospital.

A producer can also invite potential customers to a seminar on some aspect of its product line. Union Carbide Plastics Co., for example, regularly holds technical meetings at its Bound Brook, N.J., laboratories for customers' technical staffs. Research people make many of the presentations at these meetings.

Customer Contact: Researchers can learn most about the market aspects of their companys' products by visiting customers. In cases where the product is aimed for research use, researchers may be the best people to send out on customer calls. American Smelting & Refining Co. says that just about every staffer at its Plainfield, N.J., research center visits customers to discuss fields in which the researcher is an expert.

Asarco aggressively seeks appointments for its "high-purity metals staff," a group of full-time researchers who consult with customers on specific metals problems.

In addition to helping old customers and attracting new ones, this contact also provides the company with new ideas about its own products.

A more common practice is sending researchers out with sales or technical service representatives. Jefferson Chemical Co. (Houston) sends researchers and salesmen on joint calls when the marketing people feel the presentation can benefit from more technical depth. And it works the other way, too; a researcher who feels he needs a better definition of some product may tag along with a salesman.

U.S. Borax & Chemical Co. (Los Angeles) also sends researchers out with salesmen on occasion. In addition to presenting technical information on the product, says the company, the researcher can also point out its technical advantages over competitors' wares.

Sales Aids: Other ways in which research personnel can help the marketing effort include briefing of sales people on new products and writing technical brochures to be used as sales tools. Eli Lilly & Co. (Indianapolis) is one company that holds frequent briefing sessions for its marketing people, both on new products and on background material. Most recently, the firm's director of clinical research, Kenneth Kohlstaedt, spoke to company salesmen on congestive heart failure and its relevance to Lilly's products.

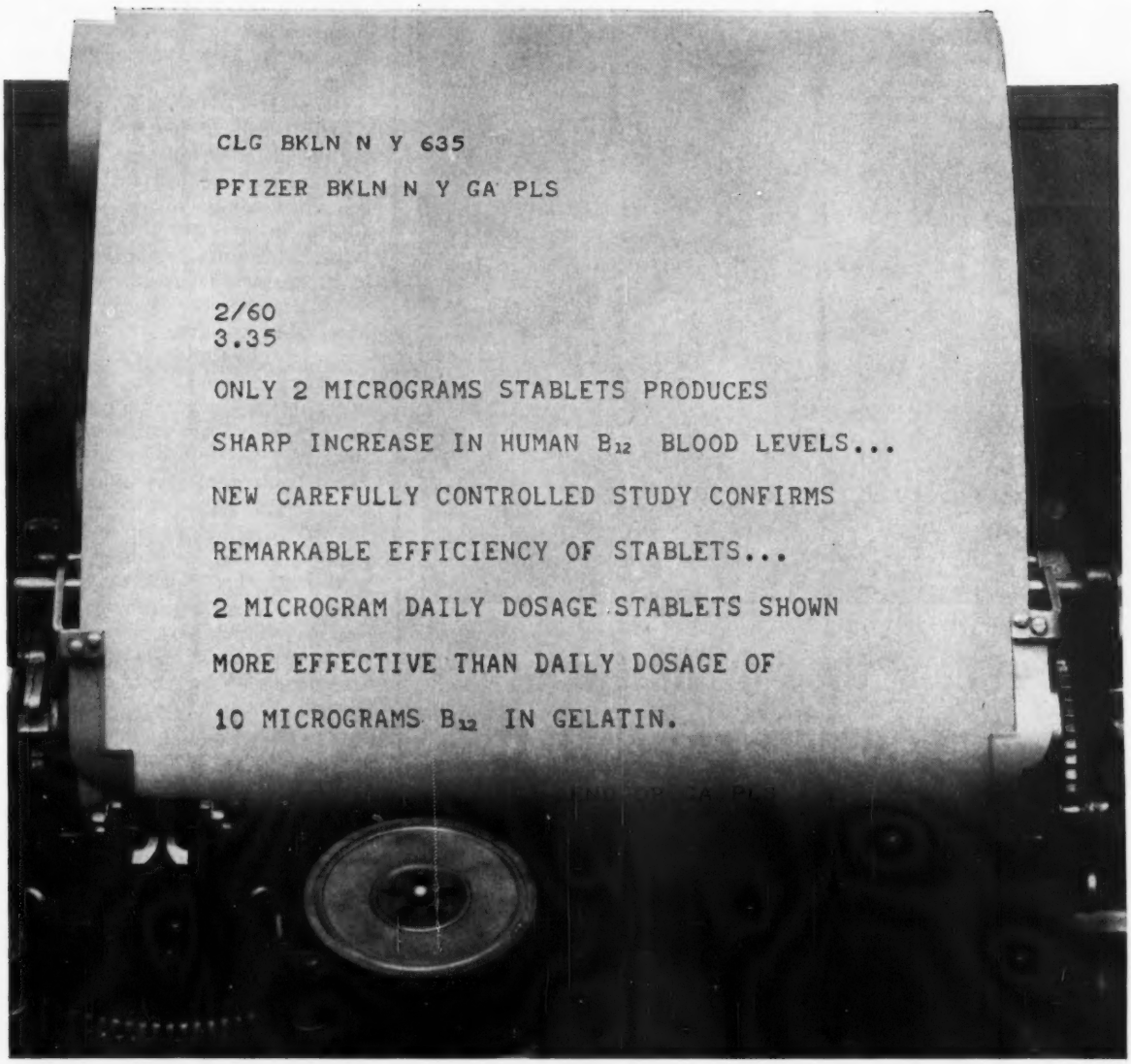
Ciba Pharmaceutical Products Inc. (Summit, N.J.) holds an orientation session for the whole marketing staff each time a new product is introduced. In such a session, research personnel run through the chemistry, pharmacology and clinical history of the compound.

Collier Carbon & Chemical Co. (Los Angeles) has an agronomist who consults with colleges and research groups on the best methods of applying fertilizers. He passes this information on to the company's sales force in the form of a brochure. The latter is used as one of the key sales pieces in showing farmers how to use the company's products efficiently. In some other companies, researchers write all technical brochures and supply most of the material that goes into technical ads.

Other Efforts: It's common to include research personnel among company representatives at new-products press conferences. If patent position is not a problem, researchers can field

Research Symposium Spans Atlantic

A transatlantic telephone symposium on estrogen metabolism—joined by researchers in New York and Amsterdam—was completed recently under the sponsorship of the Excerpta Media Foundation. New York participants (*left to right*) included Robert Greenblatt (Augusta, Ga.); Laman Gray (Louisville, Ky.); Peter Warren (New York); and Edwin Hamblen (Durham, N.C.). They conferred with Peter Bishop (London); Egon Diczfalusy (Stockholm); H. de Watteville (Geneva) and I. A. Wijsenbeek (Amsterdam), who was also the moderator. A grant from Ayerst Laboratories (New York), division of American Home Products Corp., covered costs of the symposium, which yielded new ideas in estrogen therapy.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The results of a carefully-controlled new study*, employing a large number of subjects, provide conclusive evidence of the superior B_{12} absorption of Pfizer STABLETS® compared with the gelatin form of the vitamin.

The study compared the serum levels produced by 2-microgram and 10-microgram tablets of commercial vitamin B_{12} in gelatin and commercial STABLETS over a two month period. The table shows the higher level achieved with STABLETS.

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2 mcg. Stablets . . .	+103
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Pfizer STABLETS are available in two types: STABLETS *Type I*—1% crystalline vitamin B_{12} U.S.P. adsorbed on resin; STABLETS *Type II*—1% cobalamin concentrate N.F. adsorbed on resin.

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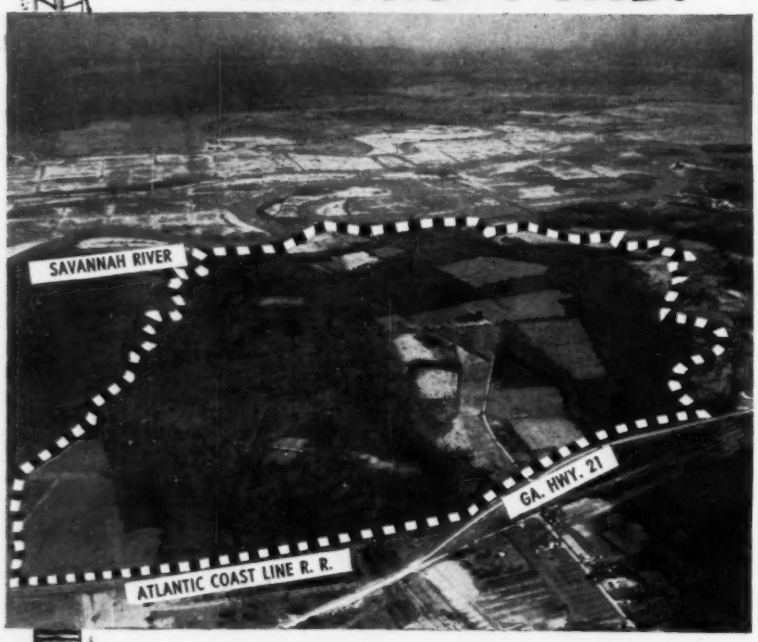

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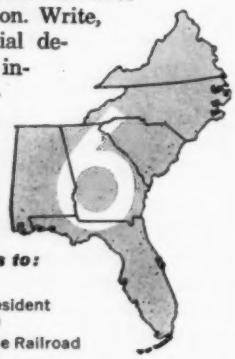
These and many more advantages make this river front site well worth your investigation. Write, wire, or phone Coast Line's industrial development specialists for details. All inquiries held confidential; no obligation, of course.

...serving the Southeast Coastal 6



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R. P. JOBB
Assistant Vice-President
Department K-30
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all the technical questions, particularly since the product in question is often too new for most others in the company to have a thorough grasp of it.

Researchers from at least one large company call on the press to help stir up interest in new products that have not yet been integrated into the company's regular promotion effort. Object: to get the product better known in industry by stimulating an initial experimental-quantity demand; to get ideas for new applications; and to use these two results to "sell" the product to one of the company's manufacturing divisions. This can be a formidable task when the producing divisions are in competition with one another on their profit-and-loss statements. It's safer to go with the tried-and-true products.

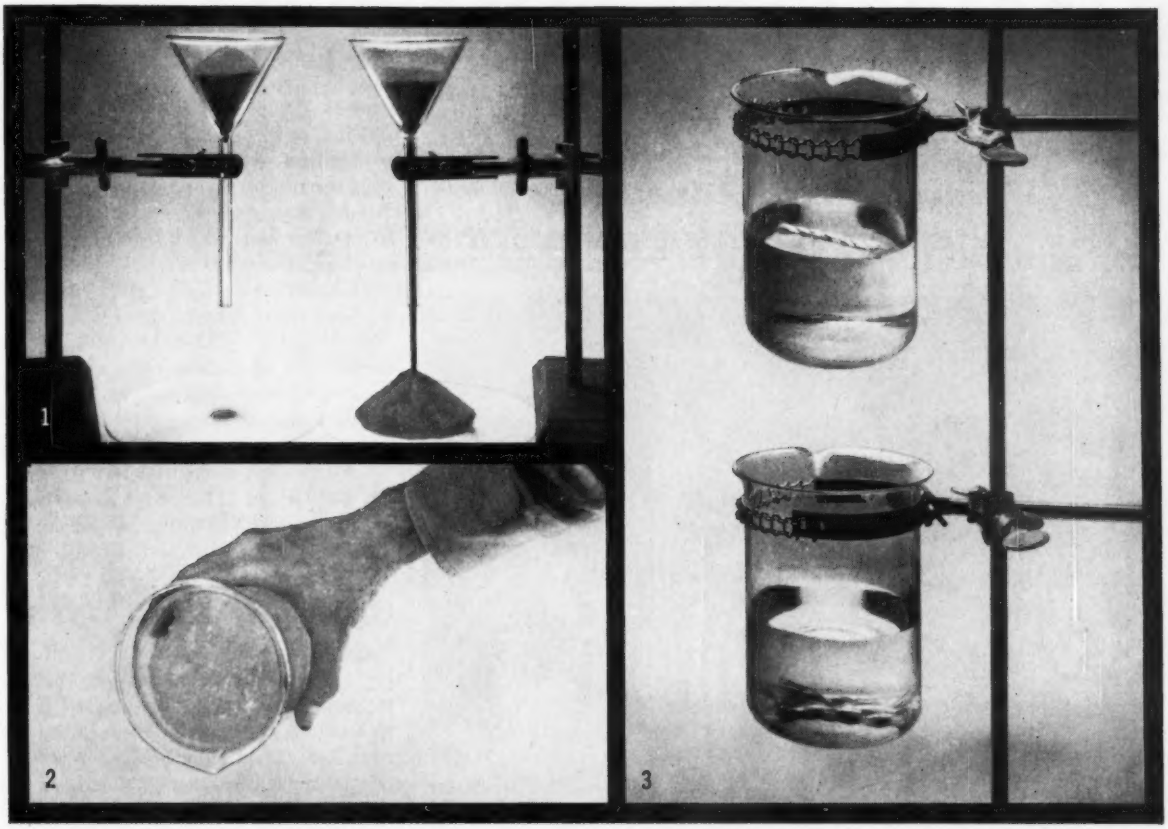
Dow Chemical Co.'s Texas Division (Freeport) researchers have another kind of double-selling job. They must first convince the technical service and development people at the company's Midland, Mich., headquarters of the merits of a new product; then they follow through by working with TS&D in promoting the product among customers.

Researchers also contribute to promotion by participating in advertising. Ads of this type usually spotlight individual researchers and their specialties (*CW, Nov. 22, '58, p. 53*).

Part-Time Job: In each of the cases mentioned, the researcher performs his "selling" function on a part-time basis; his primary responsibility is research. In more and more companies, product development groups (staffed by former research and other technical people, but reporting to marketing management) are combining technical know-how with marketing duties.

Celanese Corp. of America (New York), for instance, formerly used researchers as marketing aids, now fills this need almost entirely with its applications and product development group. And a large Southwestern oil and petrochemical company believes this separation is necessary for objectivity in evaluating new products.

But in those companies that cannot afford additional facilities and manpower, or whose product lines demand the closest relationship between research and customer, many researchers will continue to devote time to market-oriented activities.



Three of the many helpful properties imparted to industrial processes are **1)** making resin-coated foundry sand flow freely with Witco Calcium Stearate; **2)** gelling mineral spirits with Witco Aluminum Stearate #22; **3)** waterproofing rope with Witco Aluminum Stearate #119.

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■ promote free flow of powders–prevent caking ■ waterproof rope, films, coatings, paper, concrete ■ gel higher esters, aliphatic, aromatic and chlorinated hydrocarbon solvents ■ for interesting reactions, oil soluble organometallics ■ lubricate plastics internally ■ facilitate mold release or extrusion of metals, plastics, ceramics, rubber ■ improve suspension of solids ■ you do all this and more with metallic stearates. Metallic stearate versatility brings new benefits to your products...new ease to your processes. Write Witco, manufacturers of the broadest line of stearates available.

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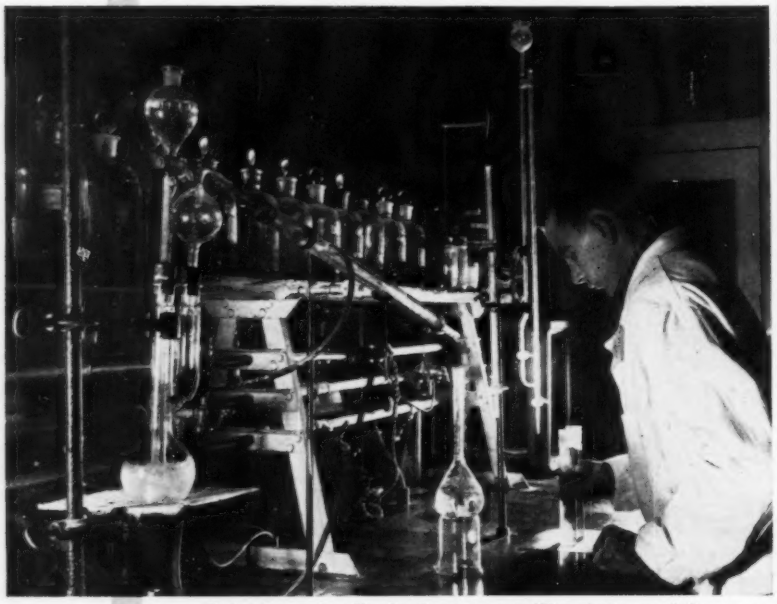
Quality controlled from limestone deposits to your lime operations



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Mississippi Lime Company's entire limestone deposits test 99% pure calcium carbonate... a natural purity and uniformity unequalled in such quantity anywhere.

This nature-endowed purity is carefully guarded throughout every mining, processing, testing and shipping procedure. As a result, when you standardize on "Mississippi" you can always count on lime and lime products of uniformly high quality.

Our skilled technicians will consider it a privilege to consult with your technical staff on possible applications or help in the solution of any problem.

***Any quantity* of lime ready *any time* for immediate shipment *anywhere* BY RAIL... BY BARGE... BY TRUCK**

MISSISSIPPI LIME COMPANY

ALTON, ILLINOIS

RESEARCH

Strike 'Gesture'

Over 1,100 technical staffers, including scientists and engineers (all civil service employees), took a day off recently at Britain's Harwell Atomic Energy Research Establishment in protest over pay, status and administration grievances.

Only the administrative staff at Harwell has received a pay increase since '58. Also, the number of senior administrators at Harwell has increased 66% in number since '58, while that of scientists and engineers has increased only 22%.

Civil servants can't strike legally, so the Harwell work force took a one-day leave, applicable toward the annual leave allowance.

Gilded Buildings

Gold-plated buildings are in the offing for the '60s, according to the Hanovia Liquid Gold Division (East Newark, N.J.) of Engelhard Industries, Inc. Organic gold solutions are being supplied to manufacturers of porcelain-enameled steel panels, stainless steel, ceramic tile, glazed brick, terra cotta, structural glass and other construction materials. The solution is applied to the surface of the part to be plated, which is then fired in an oven to produce the desired plate. Cost of the gold film is about 10¢ per micro-inch of film thickness per square foot of completely coated area.

Mite Fighter

A new weapon against the citrus red spider mite, the principle citrus pest, is being readied at the University of California (Riverside). But it's already showing signs of obsolescence.

The mite has become resistant to a number of miticides, especially the organophosphorus compounds, that once gave good control. In extensive citrus areas, only a few miticides remain effective. Now, according to U. of C. entomologist Lee Jeppson, growers can control citrus red mites on orange and grapefruit trees with Tedion (2,4, 4',5-tetrachlorodiphenyl sulfone) developed by Niagara Chemical Co. at Richmond, Calif. The compound kills the mites before they reach adulthood and controls the foliage pest for six months to a year with a single appli-

CHEMICALS OUTLOOK

March, 1960

This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

NEW BULK-TRUCK LOADING STATION SPEEDS SODA ASH SHIPMENTS

Bulk-truck shipments of Wyandotte Soda Ash are going out this month from a new loading station designed to accommodate trucks of maximum length . . . equipped to weigh loads up to 60 tons with extreme accuracy . . . and engineered to cut loading time to minutes. The tonnage we can handle here is now roughly doubled.

The new scale platform is 60 feet long . . . well beyond the maximum length of trucks in Michigan. Its present height provides for a clearance of 14½ feet. And, should it become necessary to allow for greater heights, this clearance can be increased.

A second loading station is being made available to handle peak demands without delay.

The new scale is of the latest type . . . railroad pattern, with an automatic indicator to register weights. It permits the most accurate determination of actual weights . . . prints gross, tare, and net weights in duplicate.

Two gravity-type loading bins — one of 400-ton, and one of 200-ton capacity — have been installed to speed handling of standard grades. All other grades commonly shipped by truck are linked directly to loading spouts by conveyors.

The clockwork operation of this entirely new loading facility offers several significant benefits to users of Wyandotte Soda Ash. One is rapid delivery. Another is ready availability of all grades shipped in bulk-truck quantities. Still a third is assurance of the utmost accuracy in weight determinations.

If you are within trucking distance from Wyandotte (remember, a return load may bring Wyandotte closer than you'd expect), and would like to know specifically how this new loading facility can work to your advantage . . . write us. We'll be glad to talk it over with you. Address your inquiry to Department CO for immediate attention.

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SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA • CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE • MURIATIC ACID • HYDROGEN • DRY ICE
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RESEARCH

cation. It is also effective against mites that are resistant to organophosphorus miticides.

But the mite is able to develop resistance to Tedion, too, Jeppson warns. His recent tests show mites become resistant to the chemical after three to five successive applications. In normal use, this would be three to four years.

Jeppson hopes that by the time mites have developed an immunity to Tedion, he will have newer, more potent miticides to work with.

EXPANSION

• The Technical Branch of the Electro Minerals Division of The Carborundum Co. (Niagara Falls, N.Y.) is constructing a $750,000 lab and office building for completion this June.

• Olin Mathieson Chemical Corp. has established analytical laboratories in New Haven, Conn., to serve all the firm's production and research facilities.

• A center modeled after North Carolina's research triangle is being planned at the University of Kentucky (Lexington). Legislation calling for an appropriation is pending. At least one large industrial firm is reportedly interested in setting up its own research facility at the center.

• Wood Conversion Co. will build a research and development center in the St. Paul, Minn., area. The company has 45 staffers at its present research labs in Cloquet, Minn.

• Jefferson Chemical Co., Inc. (Houston, Tex.), has formed three new divisions—research, development, and technical service—within its R&D division, appointed separate managers for each.

• Parke, Davis & Co. will expand its virus vaccine experimental and development facilities at the firm's Parkedale Farm, near Rochester, Minn.

• Food Machinery and Chemical has now fully staffed its new chemical research center at Princeton, N.J.

• An industrial research center at Princessville, N.J., is planned by The Townsend Corp. of America (New York and Short Hills, N.J.). The 476-acre tract is near Princeton University, hub of a research complex (*CW, Feb. 21, '59, p. 75*).

• Armour & Co. (Chicago) and Carlo Erba (Milan, Italy) will col-

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assures profitable performance!

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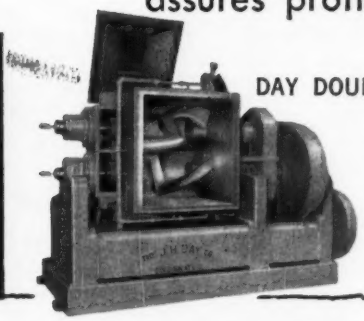

DAY DOUBLE ARM MIXERS

Can't be beat for heavy-duty mixing of viscous fluids and semi-solids. Many types and capacities.

DAY PONY MIXERS

Are the peak of design for all change-can mixing of liquids, pastes, granulations. Single and twin motion models.

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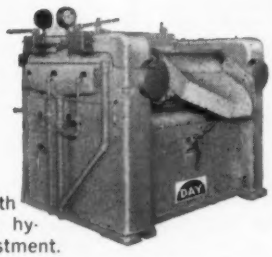
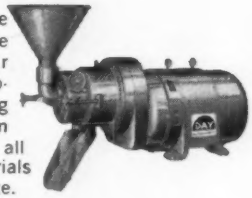
DAY 3-ROLL MILLS

Unsurpassed for fine dispersions of paints, inks, plastisols, ointments and many other heavy pastes and similar materials. Production and laboratory models with screw-type or advanced hydraulic roll pressure adjustment.



DAY HY-R-SPEED MILLS

They are the choice of the industry for grinding, homogenizing and blending, in one operation, all types of materials flowing or paste.



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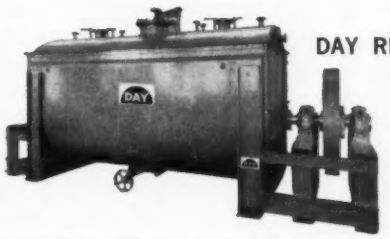

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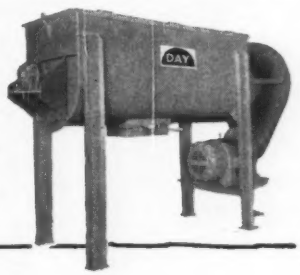
Produce perfect mixing of powders, pastes and liquids. The line is complete —light, medium, and heavy-duty designs.



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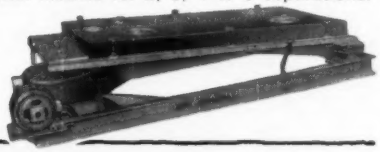
DAY RO-BALL SIFTERS

With super-active ball cleapers, insure fast, thorough sifting of wet or dry materials. Models for 2, 3, 4 or 5 separations.



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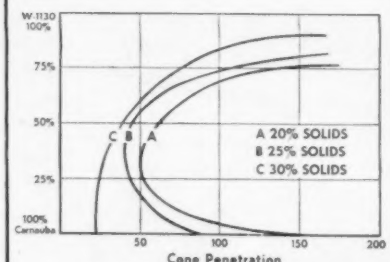

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RESEARCH

laborate on pharmaceutical research in a new Milan organization named Soc. per Az. Armour-Erba.

• Polio vaccine discoverer Jonas Salk is seeking a 70-acre site overlooking the Pacific Ocean near La Jolla, Calif., for a major medical research foundation. One of its principal functions would be cancer research. He is asking the city to donate the land—which takes majority approval of the voters.

APPARATUS

End Point: Chicago Apparatus Co. (1735 North Ashland Ave., Chicago) is offering a new recorder for potentiometric, pH, Redox, precipitation and other titrations. The device, called the Potentiograph, is made by Metrohm Ltd. (Herisau, Switzerland), costs "less than $4,000."

•

Hot Box: L & L Manufacturing Co. (804 Mulberry St., Upland, Chester, Pa.) is turning out six models of a special research furnace called the Dyna-Trol. Units feature rapid heating—can boost temperatures 2000 F in an hour.

•

Screen Find: Small expanded metal meshes of ductile materials, including precious metals, are available from Designers Metal Division, North American Cement Corp. (650 Hoffman St., Hammond, Ind.). Suggested uses: for R&D in catalytic screens, battery elements, diffusers and filters.

LITERATURE

• The first volume of a four-volume science encyclopedia to be published in the Soviet Union is ready for the press. The volume includes more than 6,500 articles with about 4,000 illustrations. It will stress, according to press reports, nuclear theory and the behavior of materials under irradiation, high temperature and pressures; new uses of radioisotopes, gamma rays and neutrons in industry.

• "Research and Development Expenditures of Selected Groups of Nonprofit Institutions, 1957," a preliminary report, issued by the National Science Foundation, is the 18th in the series "Reviews of Data on Research and Development." Superintendent of Documents, Government Printing Office, Washington 25, D.C. Price: 5¢.

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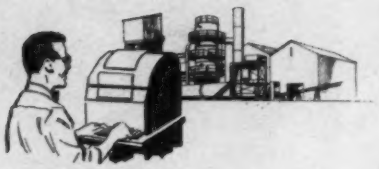

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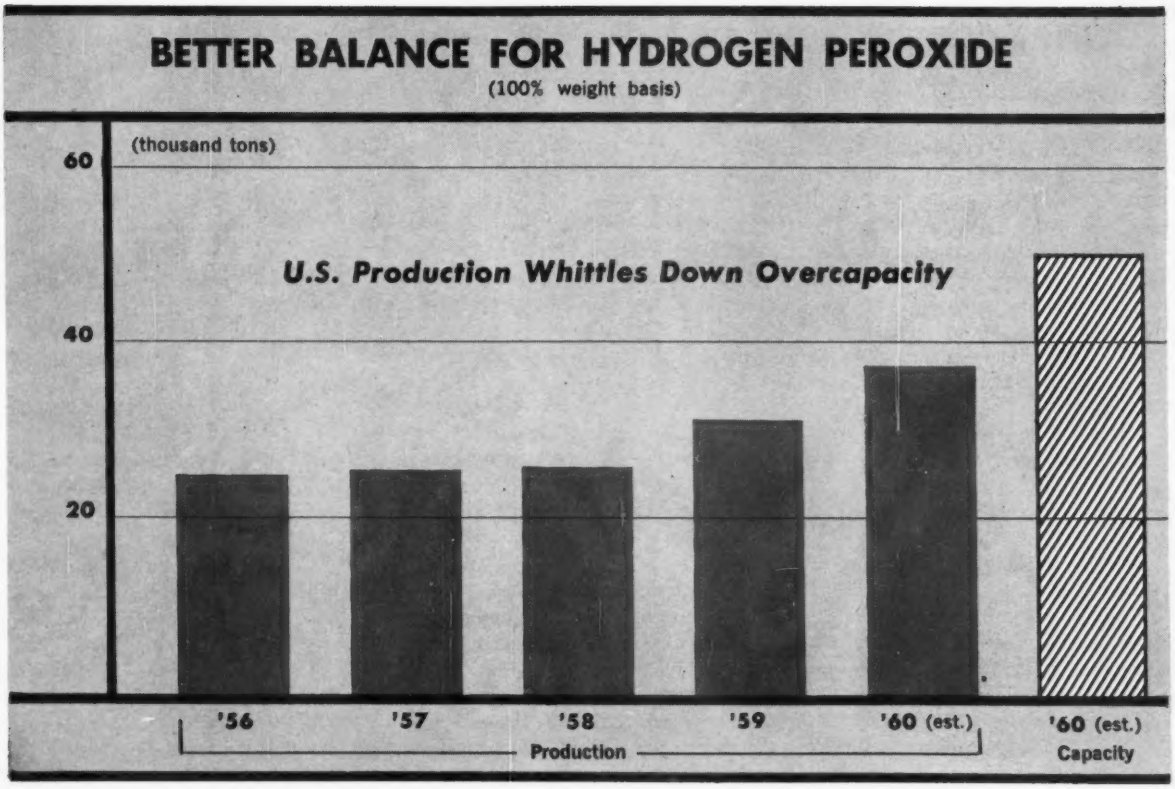

Peroxide Output Perks, Cuts Overcapacity

When U.S. military technicians turned their backs on hydrogen peroxide as a major component of rocket propellents, the U.S. peroxide industry was stranded on a production plateau in the shadow of a mountain of inactive capacity. But now there's hope that in the next few years peroxide production can scale the heights (see chart above).

One reason for the optimistic outlook: peroxide production in '59 climbed almost 20% above '58 levels. Industry experts, moreover, anticipate further production gains, to 70-80 million lbs./year, in '60. But, though gains will be significant and steady, a spectacular surge is not in sight.

How Much Capacity? Blocking a clear evaluation of the size of the challenge is uncertainty about total U.S. peroxide capacity. The muddle stems from a general reluctance of producers to discuss their own capacities—although most are willing to help pin down capacities of others. The resulting aura of mystery would convince consumers that producers have a more serious overcapacity problem than is actually the case.

Estimates of total U.S. peroxide capacity range from 90 to 110 million lbs./year. Best bet: about 100 million lbs. Here's how capacities of individual firms shape up:

Du Pont and Becco (division of Food Machinery and Chemical) each have about 24 million lbs. Du Pont's total has been shaved somewhat because of closing of two plants. Its Dresden, N.Y., unit (rated at 7 million lbs./year by some observers) was shut down because the plant's outdated process was considered uneconomical and because military requirements for high-strength peroxide produced there had been drastically curtailed. Du Pont also closed down a small peroxide unit at Niagara Falls, N.Y.

Meanwhile the company has been boosting capacity at Memphis, Tenn., from 12-15 million lbs./year to a probable 24 million lbs.

Considerable speculation colors conjecture about Becco's total capacity — some trade experts rate the Buffalo plant at 12 million lbs./year, the Vancouver, Wash., unit at 8 million. But, there's reason to believe that the Vancouver unit has been underrated; its capacity may be roughly comparable to the Buffalo plant's—in any case, significantly higher than 8 million lbs.

The bulk of Becco's hydrogen peroxide output is for sale on the open market—only a small part is used captively in manufacture of perborates. There's considerable conjecture about Du Pont's captive uses. Some observers guess Du Pont uses as much as 5 million lbs./year of hydrogen peroxide in the manufacture of viscose. Du Pont will not substantiate this.

Shell Chemical's 30 million lbs./year of hydrogen peroxide capacity

will likely be fairly evenly divided between captive (in manufacture of glycerine) and merchant production. But this balance could change quickly, depending on how Shell shifts its interrelated production setup to best profit on peroxide, glycerine and epoxy markets.

Allied's plant at Syracuse, N.Y., is rated by some at 12 million lbs./year, but is actually closer to 10 million. The two smallest producers are Columbia-Southern (about 5-million-lbs./year capacity at Barberton, O.) and Pennsalt (2 million lbs. at Wyandotte, Mich.).

End-Use Outlook: Industry spokesmen generally agree that the end-uses of hydrogen peroxide haven't changed much in the past year or two. Textile applications are rated as top consumer, taking an estimated 40% of peroxide used in the U.S.

Chemical applications (e.g., epoxidizing of fats and oils, production of insecticides and inorganic peroxides) are said by some to take 24% of all peroxide used. Others insist this holds only if military applications are included in this category.

Pulp and paper bleaching takes an estimated 13%, manufacture of foam rubber about 3%, miscellaneous uses perhaps 20% of the total.

Textile and pulp-paper industries —both closely keyed to population growth—will boost their peroxide consumption. The relative cost trends of hydrogen peroxide and sodium peroxide—two competing bleaching materials—could help swing pulp-paper business to the former.

During the past five years, price of hydrogen peroxide has remained steady at 18¢/lb. (35%, tanks, delivered), while cost of sodium peroxide has increased from 18.5¢/lb. to 21.5¢/lb. At this rate, say hydrogen peroxide boosters, the time may soon come when hydrogen peroxide cost (in terms of active available oxygen) is competitive with that of sodium peroxide. The contention is that, price being equalized, hydrogen peroxide would be a preferable material.

Manufacture of foam rubber still accounts for about 3-5% of total hydrogen peroxide demand—surprising in light of competition from plastic foams, especially urethanes. The answer may lie in peroxide's specialized use in this field—i.e., in the production of lightweight products with fine pore structure. Bulk of foam rubber is made by the Dunlop process, which does not utilize hydrogen peroxide.

Versatile: The host of varied uses that together comprise the miscellaneous category—representing about 20% of total peroxide consumption —point up the chemically versatile nature of hydrogen peroxide.

Brightest hope in this general group used to be rocket propulsion. And, though this market suddenly fizzled (but did not disappear), optimistic marketers don't rule out possibility of renewed interest. "Who can predict," says one, "when and in what direction the military is likely to change its mind?" Idle capacity—boron as well as peroxide—stands as mute testimony to the capricious nature of chemical markets tied to modern, fast-evolving rocketry.

However, most peroxide boosters view other applications as more serious contributors to the industry's future growth. Uses run the gamut from photography to ore flotation, polymerization catalysis to glue manufacture, laboratory reagent to permanent wave neutralizer.

In this regard, food processing is worth watching. Peroxide is useful in processing of dried egg whites, bleaching of flour (benzoyl peroxide), and as a substitute for pasteurizing of milk and milk products.

Epoxy Breakthrough? Fondest hopes of the hydrogen peroxide industry are now keyed to many potentially big chemical process applications—epoxidation, in particular. There's no suggestion that hydrogen peroxide will displace epichlorohydrin, in epoxy resin production. But the manufacture of other epoxidized products offers a potentially large market opportunity.

Some market analysts already rate epoxidation of fats and oils (in production of plasticizers and stabilizers for vinyl chloride resins) as major chemical use for hydrogen peroxide.

This picture is dimmed, however, by the fact that peracetic acid—derivative of hydrogen peroxide used in epoxidation—can be made from acetaldehyde without use of hydrogen peroxide. If production-sales economics should favor acetaldehyde-derived peracetic acid, hydrogen peroxide markets in epoxidation would be jeopardized.

Price is, of course, a critical factor in hydrogen peroxide's future. Many industrial uses are now stymied by too high a price, yet some producers say that the price should be higher. In light of the current overcapacity, possibility of a price boost is remote. But price might well drop if a really large-scale market were to develop. The situation revolves around the chicken-or-egg problem of which must come first, lower prices or greater demand?

Exports Dwindle: Aggravating the overcapacity problem is a continuing decline of exports. In '59, for example, hydrogen peroxide exports dropped to about 1.25 million lbs. (valued at $344,584)—less than half of '58 exports, which amounted to more than 2.78 million lbs., worth $744,304.

Peroxide exports are declining mainly because of growing capacity in the buying nations. New plants have been built—or are going up—in Canada, Mexico, Japan. (U.S. interests are reportedly involved in the Mexican and Japanese ventures.)

The fortunes of the U.S. hydrogen peroxide business in the next few years will be marked by several distinct trends: disappearing exports; steady but not spectacular decline of overcapacity; price stability. But today's forecasts could easily be rubbed out and redrawn overnight if the industry gets a hoped-for big breakthrough in a major chemical process application (e.g., epoxidation).

Mexico's Triple Trouble

A rough-and-tumble battle over Mexican phosphates markets now looms. Subsidiaries of two U.S. firms —Monsanto and Hooker—are in a position to flood the country with trisodium phosphate and phosphoric acid. Here's how CHEMICAL WEEK's Mexican observer sees the impending warfare.

Monsanto de Mexico recently built a phosphate plant—costing more than $2 million—with more than adequate capacity to meet Mexico's domestic needs. But after completion of the plant, the firm had trouble selling trisodium phosphate to a major user —a Mexican soap company that had a tight contract to buy material imported from a U.S. plant of Hooker. (Hooker was also exporting to several

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Borden Chemical's Development Laboratory at Peabody, Mass., developed it. But the main point is that the research done at Peabody is just one example of Borden's work in thermosetting and thermoplastic resins. All told, coast to coast, Borden Chemical has seven such labs with the capability to solve an infinite variety of resin and polymer problems. Including yours! Write Borden Chemical Co., 350 Madison Ave., New York 17, N.Y.

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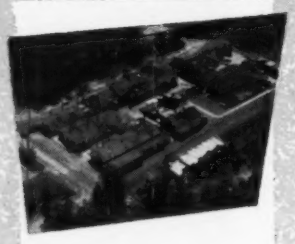

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other companies located in Mexico.)

Meanwhile Monsanto's new unit created problems for Hooker; completion of the Mexican plant virtually closed the door on further imports of phosphate from the U.S. But Hooker eyed its mining concessions on Mexican phosphate rock and its one good phosphate customer, decided to move in and do battle for the market.

Its new, $1.5-million phosphate plant—located near the Monsanto unit—is almost completed; there's no official revelation of plant capacity, but Mexican observers put it at about 20,000 tons/year. Monsanto has an annual capacity of 30,000 tons.

Before Monsanto started producing phosphate, Mexico was importing 20,000 tons/year of triple phosphate, 1,000 tons/year of phosphoric acid; such consumption obviously is far below the combined Monsanto and Hooker production capacities.

What happens now? Monsanto reportedly is trying to prevent Hooker from receiving the special "new industry" tax benefit that Monsanto was given. But industry sources think Hooker will probably get the concession. Another facet: that the engineering firm that built the Monsanto plant was hired to construct the Hooker facilities.

Meanwhile, soapmakers that buy the phosphate are delighted with the situation, are sitting back, hoping for a price war.

Japan Calls for Help

Japanese Chemical Industry Assn. is now pushing hard for tariff increases (20%-30%) on imported chemical products. The move comes right on the heels of Japan's new three-year trade liberalization program.

Japanese chemical manufacturers expected to face liberalization of foreign trade sooner or later, but the current hue and cry evolves from claims that the Japanese CPI isn't yet solidly enough entrenched to battle the U.S. chemical industry effectively. In any case, there will be a gradual increase of U.S. raw-materials imports and a simultaneous step-up of finished-product exports (to Asia and Africa). Materials which Japanese experts believe will be imported increasingly from the U.S. include pulp, vegetable oil, benzene, phenol, cresol, toluene, fats.

On these items, there are some troublesome price inequalities. Prices of benzol, cresol, phenol and toluene are reportedly high, compared with U.S. prices, whereas creosote and pitch prices are low; caustic soda is high, while chlorine and calcium carbide are low.

Consequently dyestuffs and paints are priced disproportionately high, while products such as polyvinyl chloride are "comparatively low in price."

'60 Outlook: Japanese chemical and chemical fiber firms are expected to switch increasingly to petrochemicals "because crude oil is available in Japan as cheaply as in the U.S. and Europe." And if there is any difference in cost, it can be compensated for by higher tariffs on imports of primary petrochemical products, the Japanese industry group says.

MARKETPLACE

The new liquid-air separation plant of Air Reduction Chemical Co. at Fairfield, Ala., is onstream. The multi-million-dollar unit will produce more than 30 tons/day of liquid oxygen, nitrogen and argon.

This is the first of two facilities on the site—the other, to be completed next fall, will supply tonnage oxygen by pipeline to Tennessee Coal & Iron Division of U.S. Steel.

•

A 120-tons/day nitric acid plant at Lawrence, Kan., has been completed by Chemical Construction. The $1.25-million unit was built for Cooperative Farm Chemicals Assn., which will use the acid to make ammonium nitrate fertilizer. Chemico claims a construction record: instead of taking 10-12 months, the firm did the job in 6 months.

•

U.S. toy makers will use about 14 million lbs. of linear polyethylene this year—about double '59 consumption—according to George Wash of Phillips Chemical's Plastic Sales Division.

Phillips estimates that toy makers used 7½ million lbs. of linear PE last year, well below the hoped-for 10-12-million-lbs. market (*CW, Sept. 26, '59, p. 42*). The '59 consumption was considerably less than 16 million lbs. used in '58.

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Immediate shipment of both 80% and 98% triethanolamine can be ordered from the Brandenburg, Kentucky, plant. Tank car, compartmented car, tank truck shipments are nitrogen-blanketed to assure color stability.

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Market Newsletter

CHEMICAL WEEK
March 19, 1960

Twelve more helium plants, and a doubling of helium price were among the ideas advanced last week by Under Secretary of Interior Elmer Bennett. Objective: conservation of U.S. helium.

Bennett proposes that the 12 new plants be built along natural gas pipelines, preferably with participation of private industry. He also suggests that Interior sign long-term contracts to buy this helium—at prices that would vary from plant to plant because of differences in helium content of the gases involved. In suggesting a price of $40 per million cubic feet (about twice the going rate), Bennett said it would not affect consumption of helium, nor the present role of compressed gas distributors.

About two years ago, the Interior Dept. backed the building of the nation's fifth helium recovery plant—a $10-million, Fluor Corp.-designed facility at Keyes gas field in Oklahoma.

•

Firing an opening salvo in the annual $350-million market battle between nylon and rayon tire-cord makers, William Dalton, president of Tyrex, Inc., predicts: "Original equipment tires on '61 cars will again be made with Tyrex (rayon) cord."

This is the time of year when auto makers decide which tire cord will be used in forthcoming models. In '60, nylon producers had to be content with providing cord for Goodyear's "captive air" tire used on a limited number of three-seat station wagons and for the racing tires supplied with Chrysler's 300-F sports model (only about 2,000 of which are produced each year). The rest of the business went to Tyrex. (*Also see Business Newsletter, p. 17.*)

Rayon producers will also be going after a new market—industrial strapping. In a few weeks, American Viscose Corp. will launch a new strapping made from rayon tire cord. Tabbed Avistrap, the new material is said to be cheaper and lighter than steel strapping. Moreover, industry sources report it is safer to use than steel, and more easily disposed of.

•

Prices of phthalate plasticizers will be raised across the board as a result of increased phthalic anhydride prices posted last week *(CW Market Newsletter, March 12)*. The new phthalate ester prices—effective April 1 on contract orders and immediately on spot sales—were initiated by Monsanto. (Monsanto was first to follow Reichhold in phthalic anhydride boosts.) Allied Chemical was among the first to follow with similar new prices.

The new quotes are from 1¢ to 1½¢/lb. higher than before. Tank-car tabs on the following phthalate esters are now set at 26¢/lb.:

dioctyl, diisooctyl, butylbenzyl. At 26½¢/lb. are dimethyl, diethyl and diisodecyl phthalates. Other tank-car prices: dibutyl phthalate, 27½¢; butyl octyl phthalate, 25½¢/lb. Costs of dicyclohexyl and diphenyl phthalates, in carloads, are 46¢ and 52¢/lb., respectively.

•

Completion of a new sulfuric acid plant at Riverton, Wyo., doubles Susquehanna-Western's sulfuric capacity to 75,000 tons/year. S-W built Riverton's first sulfuric plant about 15 months ago.

The additional sulfuric facilities were rushed to meet increasing demand for the acid, due to the new ore-processing mills recently constructed in the area. Substantial quantities of the acid are also consumed by local oil refineries, the sugar industry, and in fertilizer manufacturing.

•

Prices of n-propyl alcohol will also be advanced in the second quarter. The new quotes, initiated by Union Carbide Chemicals Co., will increase tabs 1¢/lb. on all quantities. New schedule: 12.5¢/lb. in tanks, 15¢/lb. in carloads, 16½¢/lb. l.c.l.

Prices of sulfur monochloride and dichloride are boosted, effective April 1, by Stauffer. Identical schedules for the two related materials are: tank cars, 4.25¢/lb., up from 4¢; carloads, drums, 5.25¢/lb., up from 4.5¢; l.c.l., drums, 6.25¢/lb., up from 5.25¢.

•

Cheaper polyethylene shipping sacks appear on the way. Newest hope of bag makers and high-density polyethylene resin producers is a bag 5 mils (five thousands of an inch) thick. Most bag manufacturers have considered 5-mil bags too thin to hold up under rough handling, have focused their efforts on the heavier-but-costlier 6- and 7-mil models (*CW, Feb. 20, p. 35*). But last week, one bag maker told CHEMICAL WEEK that 5-mil bags have performed well under exacting tests, might prove adequate for shipping chemicals.

•

Canada will get its first fully integrated producer of polyethylene products this September. Canadian Industries Ltd. has purchased 15 acres of land at Brampton, Ont., as the site of a new film and converting plant for polyethylene, which will use resins made at CIL's polyethylene plant at Edmonton.

SELECTED PRICE CHANGES—WEEK ENDING MARCH 14, 1960

	Change	New Price
UP		
Casein, Argentine, bgs., c.l.	$0.005	$0.1925
Oleo oil, extra, dms.	0.005	0.135
DOWN		
Carnauba wax, Ceara, refd., pure, bags, ton	$0.03	$0.77
Tin metal (Straits)	0.01	1.00

All prices per pound unless quantity is quoted.

Progress Report...

—NIAX Triol LK-380
—KROMFAX solvent

New polyether base for better, lower cost rigid urethanes

A new triol, NIAX LK-380, is now commercially available for the production of rigid urethane foams. NIAX LK-380 makes possible rigid foams with excellent humid aging properties, lower water absorption, and lower production costs.

Insulation for acoustical tiles, refrigerators and freezers are some applications of low density rigid foams made from LK-380. It is suggested in the fabrication of sandwich partitions for construction, in nonsinkable boats, life buoys, and deck guards. Foams made from LK-380 can be blown with fluorocarbon gases to give excellent thermal insulation. Investigation of LK-380 for urethane coatings and adhesives is also suggested.

Liquid NIAX Triol LK-380 (hydroxyl number, 380) is made to the same rigid specifications as other NIAX diols and triols. Rigid specifications are your assurance of excellent reproduction of foam properties—in a partial prepolymer or one-shot process.

NIAX Triol LK-380 is one of CARBIDE's many NIAX diols and triols, and is available in tank cars, compartment tank cars, or drums in carload or LCL lots. A Technical Representative in any CARBIDE office can furnish you starting formulations. For his address or for a new technical bulletin on LK-380, including specifications, suggested formulations, and foam properties, please mail the coupon.

Current news about a time-tested solvent

KROMFAX solvent (thiodiglycol, thiodiethylene glycol, B,B′ dihydroxyethyl sulfide) is a powerful, chemically-neutral solvent for vat, basic and acid dyestuffs. It is non-volatile, almost colorless, and completely soluble in water. Its hygroscopic and antioxidant properties have long been important in the dyeing industry.

The use of KROMFAX solvent to prepare printing pastes from vat dyestuffs yields a higher color intensity than that obtained with alcohol or glycerol. It gives a finer dispersion of the dye prior to reducing it and improves the solubility of the sodium leuco form. KROMFAX solvent also markedly increases the fixing rate in the pre-reducing process. Its anti-oxidant nature prevents premature conversion of the leuco base of a vat dye into the finished color.

KROMFAX solvent is especially suited for pasting basic dyestuffs usually difficult to dissolve, such as indulines and nigrosines. It is also excellent for dyes used in direct printing and in color discharge and resist printing. It helps to produce prints of higher color values in wool, silk, acetate, rayon, and nylon fabrics.

KROMFAX solvent is also useful in cleaning printing rolls on which dye pastes have become laked and precipitated in the pattern.

With thiourea and ammonium sulfate, KROMFAX solvent forms a "universal combination" that simplifies the printing of nylon with acid and direct colors. The mixture dissolves the dye, swells the fibers, and fixes the dye in the fibers.

KROMFAX solvent will condense with hydroxyl-containing compounds in the presence of acid catalysts to form mixed ethers, many of which are effective synthetic lubricants. Thiodiglycol reaction products have good inherent anti-oxidation properties, due to the sulfide linkage. Their oil-solubility makes them of interest as extenders and additives for lubricating oils. A complex ester prepared by the reaction of thiodiglycol with butyric acid and thiopropionic acid gives mineral oil lubricants greater load-carrying capacity, with better film strength.

Drum quantities of KROMFAX solvent are available from CARBIDE in LCL or carload lots. Check with the Technical Representative in your local CARBIDE office for further information. A technical bulletin listing properties, suggested applications, specifications, and other facts can be obtained by checking the coupon on this page.

Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, 30 East 42nd Street, New York 17, N. Y.

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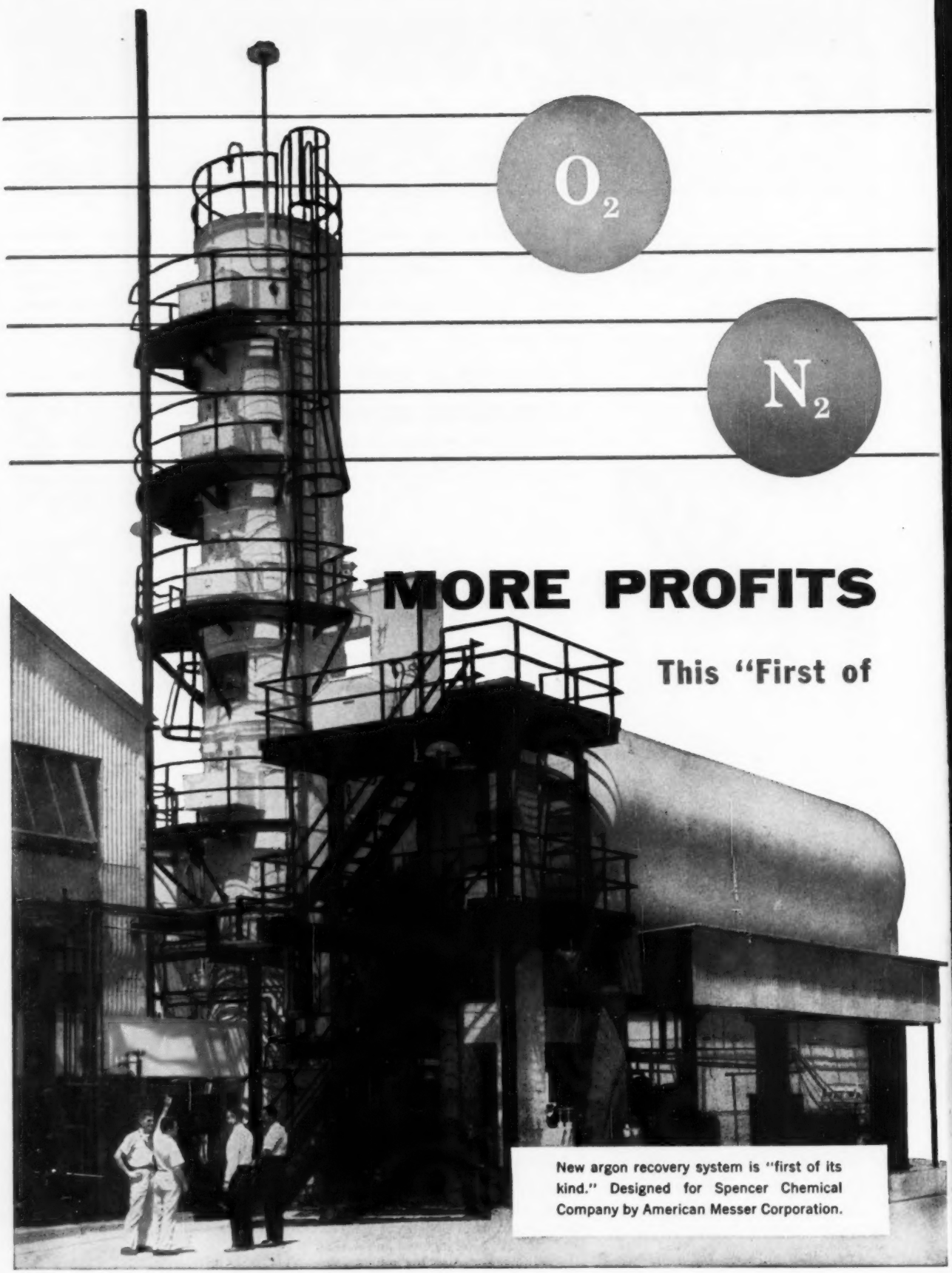
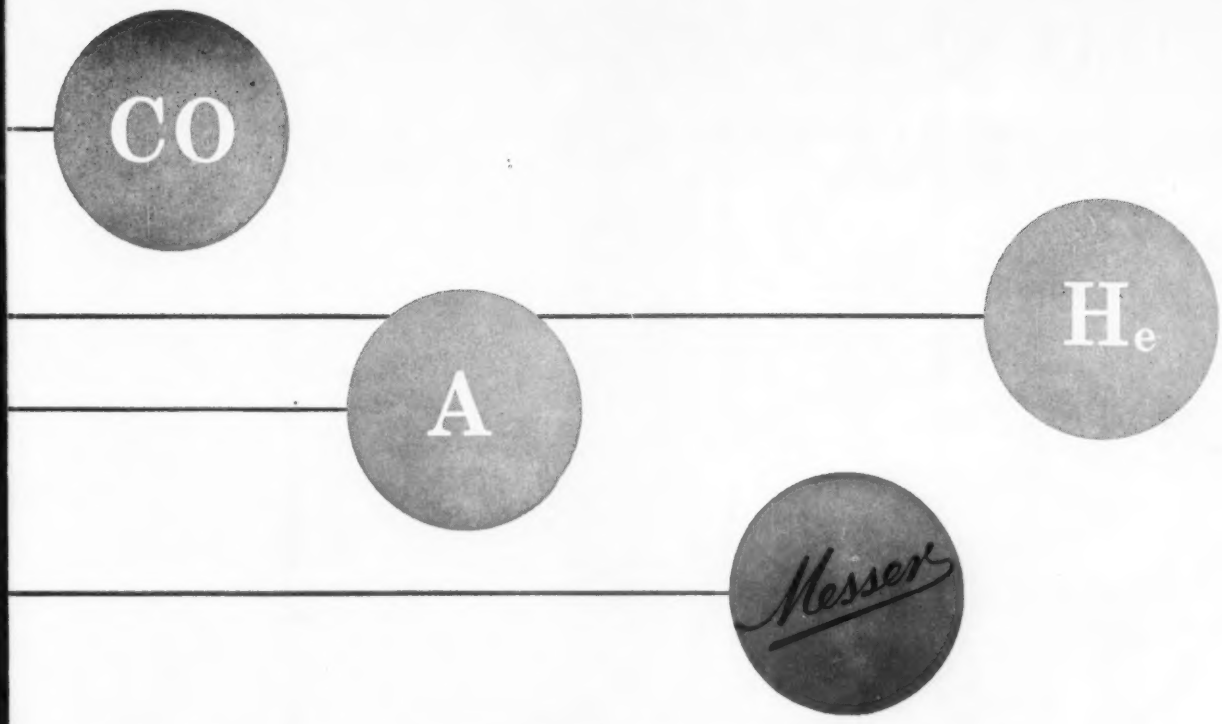


New argon recovery system is "first of its kind." Designed for Spencer Chemical Company by American Messer Corporation.



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Its Kind" Plant May Give YOU Some New Ideas

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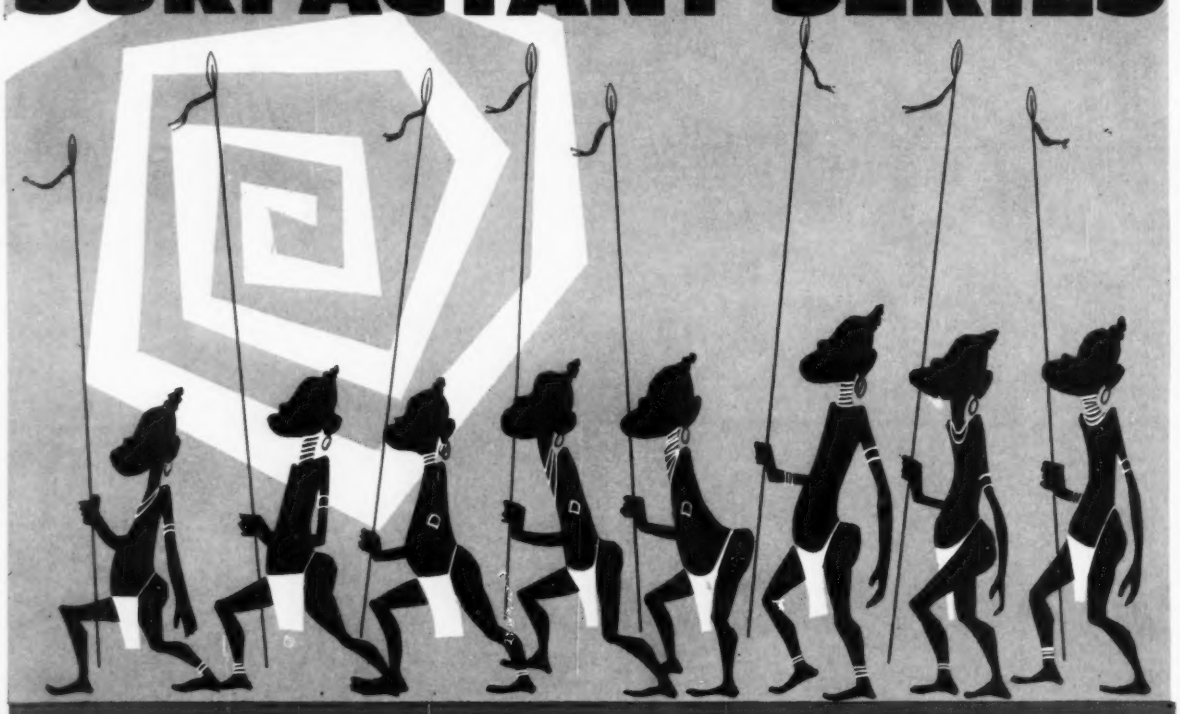

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If do-it-yourself drycleaning clicks, it could swell $85-million/year market for drycleaning compounds.

Drycleaning Due for Do-it-yourself Boom?

There may soon be a significant new factor in the $85-million/year drycleaning specialty business: coin-operated drycleaning units similar to coin-operated washing machines.

One company already has a machine in the field and two major appliance makers are readying models for introduction in the next few months. If shops featuring these units capture the public's approval, as have coin-operated laundries—which have grown 20-fold in the last four years—it could mean a sizable increase in sales of solvents, filter aids, and other drycleaning specialties.

The New Machines: The drycleaning unit already on the market is made by Standard, Inc. (Dallas, Tex.), and distributed by International Coin Dry Cleaner (Toledo, O.). This $6,000 machine, a twin tumbler unit with a total tumbler capacity of 18 lbs., weighs 1,300 lbs. Approximately 14 units are now in operation in the U.S. For about 75¢, a customer can give 9 lbs. of clothes a 40-minute cleaning in perchlorethylene. But the Standard machine, while creating some interest in the drycleaning trade, is not regarded as the ultimate in coin-operated machines. Big handicap: relatively high cost ($6,000) and bulkiness make multiple machine installation difficult. As in the coin-operated laundry field, say trade sources, a profitable operation will require a battery of machines.

Units better suited for multiple-machine operations appear to be in the offing. Both Norge Division of Borg Warner (Chicago) and RCA Victor's Whirlpool Division are reported to be about ready to bring out machines that are more compact and substantially lower priced ($1,000-2,000) than Standard's. The Norge machine is being produced at the company's Effingham, Ill., plant; the Whirlpool unit, at Benton Harbor, Mich.

The two companies' machines are very similar in makeup. Both have a single tumbler of 9-lb. capacity, call for use of perchlorethylene as a solvent and are electrically heated (no steam heater is needed).

Frequent Resupplying: The Norge and RCA machines work somewhat like the coin-operated laundry units. Servicing—depending on the amount of use by the operator—will probably be a daily or every-other-day affair, consisting of checking the general solvent level, precoating a filter and adding detergent if necessary. As now envisioned, the machines

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Property Data	
Chemical Formula	CH_3Cl
Molecular Weight	50.491
Specific Gravity	
Liquid—23.7°C/4°	1.00
20°C/4°	.92
Gas 0°C, 1 atmos	1.74
Boiling Point °C, 760 mm	—23.76
°F, 760 mm	—10.76
Refractive Index, n 20°/D	
Liquid—23.7°C	1.3712
Gas 25°C	1.000703
Solubility (in cc.) of Methyl Chloride Gas in 100 cc. of solvent (20°C, 760 mm)	
Water	303
Benzene	4723
Carbon Tetrachloride	3756
Glacial Acetic Acid	3679
Ethanol	3740

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AMERICAN DRYCLEANER

Drycleaning unit (rear) fits well into present coin-operated setup.

would be serviced from an area behind the wall into which the machine is installed.

Since there is no provision for installation of distilling equipment, sweetener powders (treated natural clays) and conventional filter aids will be used liberally to condition the solvent. In installations at established drycleaning shops, the solvent could be taken out and distilled in existing equipment.

Although there are obvious limitations to the use of such machines—such as lack of prespotting or finishing operations—this is not expected to be a deterring factor. Recently, at the annual convention of the National Institute of Drycleaning in Chicago, Joseph Wiebush, director of research of NIDC, pointed out that the machine may promote more-frequent cleaning of many items. Carcoats, sweaters, blankets, overcoats, afghans, snowsuits, comforters, sack coats are cases in point.

And wash-and-wear skirts and suits (which require little finishing) might be drycleaned in coin-operated installations instead of being laundered in home washers.

Wiebush also told the group that customers' reaction to these machines in test areas has been surprisingly good. The $1/9-lb.-load cost seems reasonable to customers. A typical 9-lb. load: three snowsuits, or four or five carcoats, or three or four pairs of trousers with a sport coat.

The test coin machines (such as Barlow's Cleaners, Benton Harbor) have attracted a large number of customers—mostly from low-income families.

New Chemicals Market: Coin-operated machines may well create a new market for drycleaning services among many present nonusers. This would mean not only additional customers for drycleaners who install these machines but also an increase in the demand for solvents and other drycleaning chemicals.

Chief beneficiary of any substantial swing to coin-operated units would be the 150 jobbers of drycleaning chemicals now operating in the U.S. The volume used by these machines would probably not warrant the expense of a manufacturer's direct selling. Of the products used by the coin-operated units solvent will set the pace in volume and dollar value.

Although there is plenty of talk in the drycleaning industry about a revolutionary new solvent for these units, machine manufacturers say it isn't so; that the machines call for "charged systems" (solvent, plus about 4% detergent) similar to those used in conventional machines. Norge, at this time, says it plans to recommend a specially tailored solvent for use in its machines—but nothing particularly unusual.

Solvent consumption by the new coin-operated machines will be about the same as that in conventional equipment: about 1 lb. of solvent/-10 lbs. of clothes.

As well as upping perchlorethylene sales in the drycleaning field (CHEMICAL WEEK estimate: $25 million/-year) coin-operated units should result in even greater gains for the present $4-million/year market for filter aids (diatomaceous earth, activated carbon, etc.). Detergents, which find a $20-million/year market in drycleaning applications, will also benefit by a swing to the coin-operated units. Other drycleaning chem-

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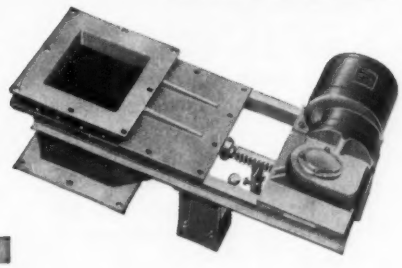

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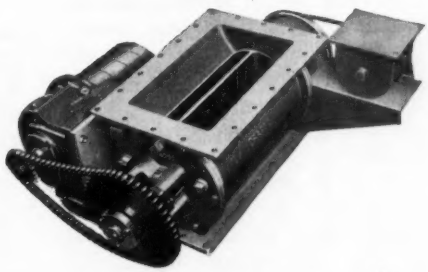

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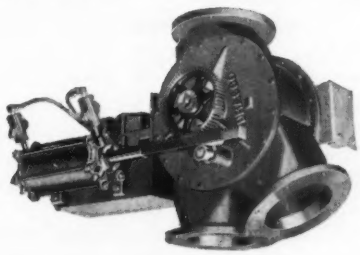

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icals such as mothproofers, spotters and water repellents, however, probably wont benefit much.

Hoped-for Markets: In addition to the U.S.'s 35,000 existing drycleaning establishments, these other retail outlets are potential markets for the coin operated machines: the country's 3,500 laundries that have drycleaning facilities; the 37,000 pressing and garment repair stores; the 12,500 coin-machine laundries (unattended) and 25,000 quick-service laundries (with attendants).

Also likely targets will be fraternity and sorority houses, transportation terminals, military installations.

Motels, hotels, apartment houses and supermarkets, though potential markets for these machines, will probably not be prime targets, at least until the machines have scored a good record for safety and reliability in other, more commercial installations.

Although these machines, because of their solvent systems, are not as simple to operate or install as are the laundry coin-operated units, this is not expected to appreciably hamper their adoption.

A more serious problem, possible hazard to users, could be a limiting factor, but the experience of small drycleaning shops situated in business districts and using perchlorethylene has demonstrated the safety of this solvent.

Of course, there is always the possibility that drycleaning groups—if they feel these machines are inimical to their own business interests — might band together and pressure for legislation restricting the machines to established cleaners. These problems, however, will likely become significant only if the machines become commercially successful.

Off the Ground Soon? Drycleaning industry spokesmen are cautious in committing themselves about the probable success of the coin-operated machines. Right now, cleaners believe they will eventually catch on. It's felt, however, that the units will not be an overnight sensation.

To the small chemical maker and jobber, this may mean a long but worthwhile wait. Such firms, getting in at the start of coin-operated laundries, have gained a sizable share of the $25 million spent annually for detergents, bluing and bleaches in that field (*CW, July 25, '59, p. 89*). The same could be true with coin-operated drycleaners. A company that cultivates this market, provides the needed technical service, some day may be in solid position as a large-volume supplier to this new and challenging field.

EXPANSION

Adding Aerosols: Midwest Consultants, Inc. (St. Louis), custom aerosol filler, has added a second packaging line to its facilities. Capacity is said to be increased almost 100%.

•

Plasti-Kote Sold: Plasti-Kote, Inc.'s (Cleveland) outstanding stock has been acquired by New England Industries, Inc. (New York), for an undisclosed sum.

•

Merger Minded: DuBois Co. (Cincinnati), industrial cleaner manufacturer, and Hall-Scott, Inc. (Berkeley, Calif.) engine and electronics company, plan to merge. Name of new company will be DuBois Chemicals, Inc.

•

Bottle Boost: Continental Can Co. (New York) is setting up plastic bottle production facilities in Los Angeles, Baltimore and Cincinnati to supplement operations of its Chicago plant. The new plants will turn out sizes up to and including 32 oz.

•

Pill Patent Abroad: Strong Cobb Arner Inc. (Buffalo, N.Y.) will license overseas drug firms to use its matrix form of sustained release tablets. Negotiations are now under way with European firms.

•

Plantfood Plant: California Spray-Chemical Corp. (Richmond, Calif.) will dedicate its "multimillion-dollar" chemical fertilizer plant at Kennewick, Wash., May 19. The plant will manufacture a complete line of liquid and dry fertilizers to serve the Pacific Northwest and states in the Intermountain area.

•

Doubling Capacity: Texize Chemicals, Inc. (Greenville, S.C.), has added two new wings to its Greenville plant as part of an expansion program to double capacity. Occupancy is expected in late March.

"Molecular Welding"—Henry Van Leur

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125	290-320	12	80-120	7-9	—
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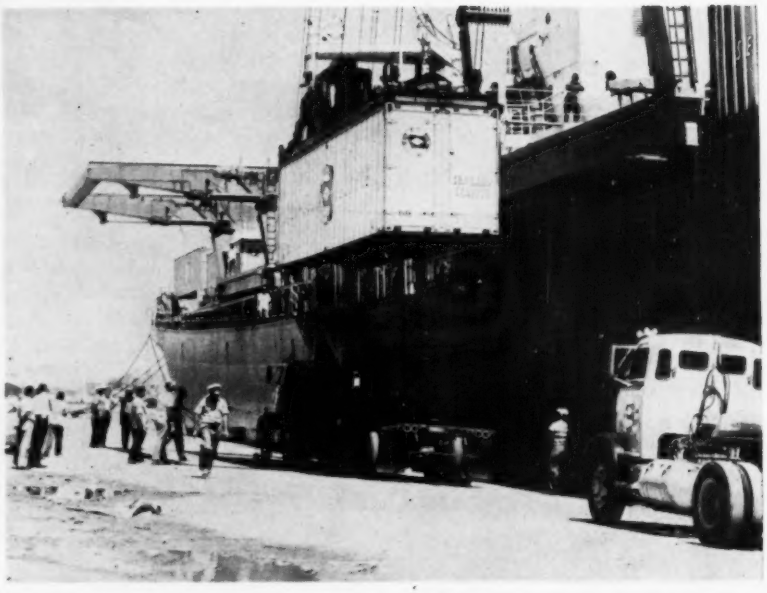


Foreign-trade zone may mean more business for Puerto Rico ports.

Free Zone for Puerto Rico?

Puerto Rico, trying to give its "operation bootstrap" an added hoist, is awaiting issuance of a formal grant from the U.S. Commerce Dept. approving the establishment of a foreign-trade zone on the island.

The grant—expected in a few weeks—could have a major effect on the future course taken by U.S. specialty chemical makers and marketers. Not only is the proposed trade zone a possible springboard for their own operations; it's also a possible leaping-off point for foreign competitors eyeing U.S. markets.

What and Where: The zone would be the first offshore foreign-trade zone established under federal act. It would be set up four miles from the port city of Mayaguez, third-largest city in Puerto Rico (population: 100,000) and situated at the western tip of the island. The zone would initially consist of about 20 fenced-off acres, be expanded to 35 when warranted.

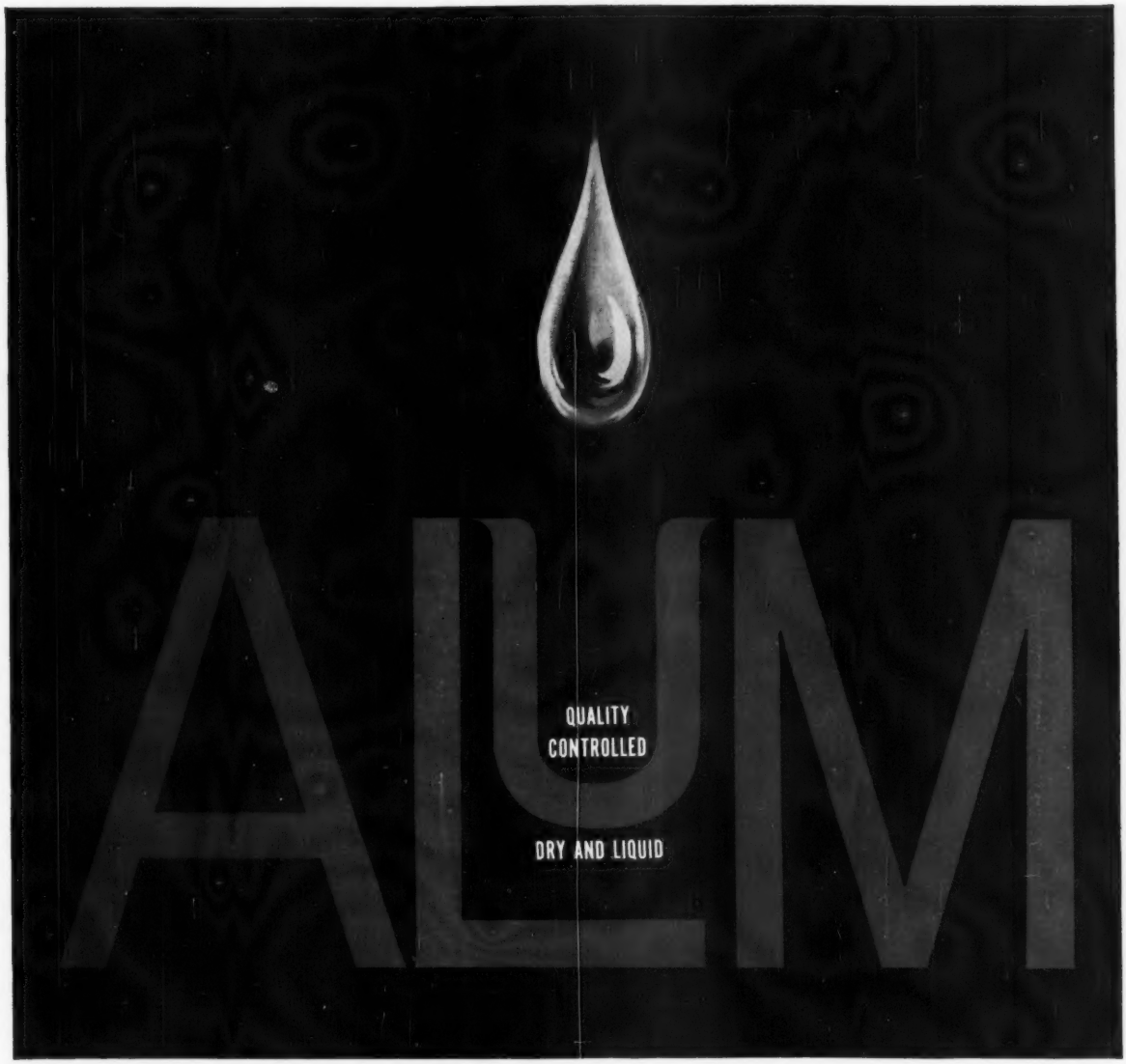
Operated as a public utility by the Puerto Rico Industrial Development Co., the zone would constitute an area where foreign and domestic merchandise may be brought in without being subject to U.S. customs laws or duties. Only foreign merchandise sent from the zone into customs territory would be subject to customs duties.

Activities permitted within the zone would be essentially unrestricted; goods could be warehoused, sold, exhibited, broken up, repacked, assembled, distributed, sorted, graded, cleaned, mixed with foreign and domestic merchandise. Some typical activities might include the repackaging of drugs vitamins and other medical items, including perfume and other toilet preparations; powdering of raw coarse materials; dyeing of imported textiles.

One advantage a U.S. manufacturer might find in the zone would be freedom to bring in raw materials and semifinished goods, process them and still pay duty only on the raw material when it enters U.S. customs territory.

Also, a U.S. manufacturer could bring in raw materials or semifinished goods without regard to quotas on them and profit by using lower-cost foreign materials. Imported commodities brought into the zone and re-exported to foreign markets would be free from U.S. duty and excise tax, although still subject to customs of other importing nations.

Among the tax advantages proposed by promoters of the zone are



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SPECIALTIES

the usual blanket exemptions from all federal taxes. This also, of course, applies to all residents of Puerto Rico, including corporations that are subsidiaries of mainland firms. In addition, most new firms would also be eligible for the following exemptions from commonwealth and municipal taxes: corporate income tax (10 years from start of operation); municipal license fees (10 years from start of operation); personal income tax on dividends (paid out of the first seven years' earnings to Puerto Rico residents; and real and personal property taxes (five to 10 years, depending on size of investment).

Many U.S. specialty makers see the development of the free port as a base for commerce with South American and Caribbean markets. But, at the same time, many European manufacturers will be sighting on U.S. markets, as well as Latin-American markets where they'll compete with U.S. companies. Should the zone be put into operation, some bizarre manufacturing and distribution schemes are sure to be set up, provide some interesting lessons in how to gain economic shortcuts by taking the long way around.

Heavy-Duty Entry

Lever Brothers, which has had the heavy-duty liquid laundry detergent field pretty much to itself with its Wisk and Liquid All, may soon be battling some stiff competition. Both Procter & Gamble and Colgate-Palmolive now have similar products in test markets.

P&G's product, a blue liquid called Gain, is packaged in two sizes of blue, flask-shaped containers (19¼ and 36 oz.). Prices: approximately 49¢ and 89¢. It's now being test-marketed in 11 counties in the Albany, N.Y., area (Pittsfield County, Massachusetts, is also in the test area).

Colgate-Palmolive's new liquid entry, Dynamo, is packaged in cylindrical cans colored red, yellow, blue and white. It's now being test-marketed in a three-county area—DeWitt, McLean and Macon—in Central Illinois. Retail price in local stores is approximately 39¢ for the pint can, 70¢/quart, $1.19/½ gal. The label suggests using ½ cup/washer load.

Purex Corp. (South Gate, Calif.), the fourth biggest seller of detergents in the U.S., is working on a heavy-duty product, but has no immediate plans for marketing. It is, however, selling light-duty liquid Trend.

B. T. Babbitt, which helped pioneer the liquid detergent field with its light-duty Glim, hasn't any product in test markets but is reported to have a shelf-tested product, not yet named, in its labs. This product might join the fray at any time.

Jeenie, Genie Make Up

The long legal contest between Colgate-Palmolive Co. (New York) and Jay Conley Co. (Mountain View, Calif.) over the names of their all-purpose liquid detergents, Genie and Jeenie (*CW, Nov. 7, '59, p. 83*), came to an amicable end last week.

The case, pending before a California circuit court of appeals, has been dismissed, and it's reported that Conley has agreed to stop using the name Jeenie for its liquid detergent.

Although Colgate declined to furnish financial details of the transaction, a C-P spokesman declared that, in the future, Colgate is free to sell and promote its product without dissent from Conley.

Last fall Conley won a federal court injunction preventing Colgate from selling Genie in the 11 Western states where Jeenie was being marketed. This injunction came after Colgate had spent almost $2 million in promoting its product.

PRODUCTS

Shark Shoo: An aerosol shark repellent is being marketed by Par Industries, Inc. (2193 East 14th St., os Angeles). The 6-oz. can may be carried by skindivers, along with other equipment. Instructions: "aim nozzle toward sharks, spray in short spurts, keep the repellent cloud between you and sharks while making your retreat." The spray is said to be effective against barracuda, too.

•

Coverup Job: Reynolds Ink, Inc. (4502 Euclid Ave., Cleveland) has come up with a tan obliterating ink that covers old stenciling and labels on cartons or boxes, permits re-use of containers. Packaged in an aerosol can, the ink is said to be nonclogging, quick drying, and waterproof.

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Philadelphia 3 ..... William B. Hannum, Jr., 6 Penn Center Plaza, LOcust 8-4330

Pittsburgh 22 ..... Duncan C. Stephens, Room 1111 Henry W. Oliver Bldg.,

San Francisco 4 ..... William C. Woolston, 68 Post St., DOuglas 2-4600

St. Louis 8 ..... R. J. Claussen, 3615 Olive St., Continental Bldg., JEfferson 5-4867

*For complete product data see catalog unit in the BUYERS' GUIDE ISSUE for 1959-60

Tracers

TO THE CHEMICAL PROCESS INDUSTRIES

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Polymer chemist with experience in calandering, extrusion, and formulation of vinyl type sheets. Small company, new product, with national distribution. P-3819, Chemical Week

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Needed Now . . . Works Manager, Chief Chemist; These excellent and stimulating opportunities have been made available through the continued expansion of Dixon Chemical Industries in the manufacturing of heavy chemicals. Location: Southern New Jersey. Send details of your experience and qualifications to: Mr. William H. Morrison, V. P. Dixon Chemical Industries, Inc., 1260 Broad St., Bloomfield, N.J.

Chemical Market Research—Small company, seeking to diversify, subsidiary of one of the world's leading chemical corporations, has immediate opening for imaginative, energetic man with broad background in chemical industry. Position entails working with top management, travel, use of initiative. Requirements include BSc. or MSc. in chemistry, 5-8 years diversified experience in research, development, marketing, New England location. Arnold, Hoffman & Co. Incorporated, 55 Canal Street, Providence, R.I., Subsidiary of Imperial Chemical Industries Ltd.

POSITION WANTED

Technical Executive—Ph.D. in Ch.E., age 39. Proven ability in process conception and development, project direction and evaluation, technical-economic feasibility studies. Diverse industrial experience includes chlorination metallurgy. Seek broader scope research, development, consulting, or assistant to president or vice president. PW-3902, Chemical Week.

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BUSINESS OPPORTUNITY

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Cosmetic Manufacturer doing $100,000 yearly with National Potential, will merge or take partner. BO-3920, Chemical Week.

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Send for Revised Illustrated Circular on our $3,000,000 chemical plant liquidation at Orange, Texas. All T316 SS equipment including tanks, columns, heat exchangers, filters, centrifugals, pumps, valves, pipe, etc. Perry Equipment Corp., 1415 N. Sixth Street, Philadelphia 22, Pa.

Liquidation: Most modern complete brewery ever! Stainless steel equipment throughout. Write for free illustrated circular: Mr. Bernard Z. Greenberg, Vice-Pres. c/o Brewers & Bottlers Equip. Corp., 104 Asylum Street, Hartford, Conn.

Lalsy Brewery, Cleveland, Ohio—Liquidating equipment of 750,000 bbl. annual capacity plant, which ceased operations few weeks ago; write for complete listing and details, glass-lined tanks, B & W Boilers, packaging equipment, stainless filtration equipment, etc., to Mr. James G. Lovelace, c/o Chas. S. Jacobowitz Corp., 3083 Main St., Buffalo 14, N.Y. Phone: AMherst 2100.

FOR SALE

DBS Plast. Virgin Bulk 35¢. Barium Hydrox. N.F. (J. T. Baker Orig.) 15 Leverpaks $0.06/lb. Toluol 10,000 gals. $.20/gal. Isoprene-Enjay virgin 3 drums $.15. Ohio Apex KP23 Plasticizer. Orig. drums $.12/lb. Virgin Neopentyl Glycol-20-100# drums. Trimethylol Propane 20-100# drums. Barrett Pyridine 15A 3 orig. drums $.35/lb. Acetone 10,000 gals. $.45/gal. DDA Plast., Virgin, 20 drs 37¢/lb. FS-3842, Chemical Week.

Resin Kettles. 2—3,000 gallon (18,000 lbs. Solid Charge), 7' diameter by 10'. Stainless with turbine agitator, cooling coils. Reflux tank and condensors each with new never used Selas gas units or one Trent electric jacket. Excellent condition equipment being replaced with larger units by synthetic resin mfgr. FS-3758, Chemical Week.

Tolhurst 48" suspended basket centrifugal, T304 SS, pref. basket, 15—7½ HP motor. Used only 50 hrs. Perry, 1415 N. 6th St., Phila. 22, Pa.

Buy To Advantage Acetic Anhydride, Glacial Acetic Acid, Acetaldhyde. "Produced locally for better service to you." Mercury Chemical Corp., Edison, N.J. Liberty 8-1540.

Niagara Filter—Niagara 260 sq. ft. diatomu-ceous earth filter with separate stainless open slurry feeder, interconnecting stainless piping, pumps, etc., all automatic controls, like new; may be shipped immediately. FS-3931, Chemical Week.

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American 36" x 84" Vacuum double drum dryer, ASME code, with convevors, elevator, etc. Model AVAC. Perry, 1415 N. 6th St., Phila., Pa.

Alvey Palletizer—Immediate delivery, Model 200 palletizer, installed new 1954; price about 1/3 of new; cut labor costs by automatic palletizing with this machine; details, FS-3927, Chemical Week.

CHEMICALS WANTED

Surplus Wanted — Chemicals, Pharmaceuticals Oils, Acids Plasticizers, Resins, Dyes, Solvents, Pigments, Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N. Y. HAnover 2-6970.

WANTED

Spectrophotometer, used, complete spectrum, recording type. A. Gersen, P.O. Box 658, Passaic, N. J.

SPECIALTIES

Paint Pigment: Smith Chemical & Color Co., Inc. (55 John St., Brooklyn, N.Y.), is distributing Stainless Steel Flake, a new pigment for the paint industry. Producer: Micronized Metals (Long Island City, N.Y.). The product is claimed to have been used successfully in vinyl and phenolic-epoxy vehicles and is now being tested in water-emulsion systems, alkyds and mastics.

•

Forage Preservative: A new use for antibiotics—preservation of harvested forage crops—is being exploited by Commercial Solvents Corp. (New York). CSC is now marketing Silotracin to prevent silage spoilage. Active ingredient is zinc bacitracin, an antibiotic that is widely used in human pharmaceuticals and veterinary medicine. Silotracin is noncorrosive, does not require special handling. Recommended application: 5 lbs./ton of silage. Price per treatment: about $1/lb.

•

Aerosol Anticorroder: Textile Adjuncts Corp. (4907 Farragut Rd., Brooklyn 3, N.Y.) has an improved version of its Water-Skipper antiresin and anticorrosion agent. Based on polysiloxanes, silicone polymers, and methyl tung oil esters, which are said to act synergistically, the product is designed for use on textile and paper equipment. It's available in cases of 16-oz. aerosol cans ($22 for 12 cans) and in bulk (75-85¢/lb.).

•

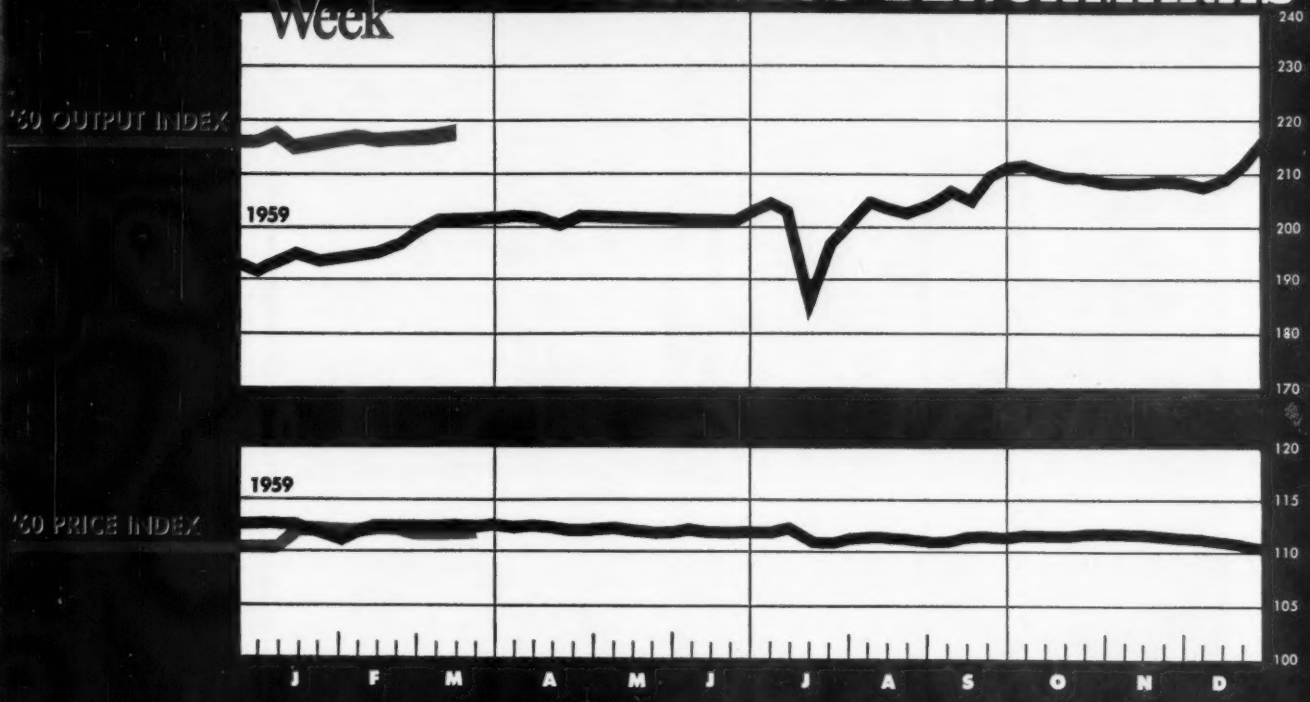
Salesmen's Kit: Talb Industries, Inc. (Front and Master Sts., Philadelphia 22), is now selling its Sani-Dust Field Test Kit for bacteriological smear tests. (A supplier of sanitizing chemicals, Talb first developed the kits to help sell its own material, then began marketing them.) The kit consists of a bisected sterile culture dish and two cotton swabs packed in glass bottles. The plastic plate can be sterilized after filling, has a shelf-life of several months. Price: $2/kit when purchased in dozen lots; $1.50 in gross lots.

•

Labeling Adhesive: Rubba-Peel, a new labeling adhesive for polyethylene, polystyrene and other surfaces, has been introduced by Rubba, Inc. (1015 East 173rd St., New York). Removable labels can be attached tightly, it is claimed, yet can be peeled off without leaving residue.

Chemical Week

BUSINESS BENCHMARKS



MARCH 19, 1960

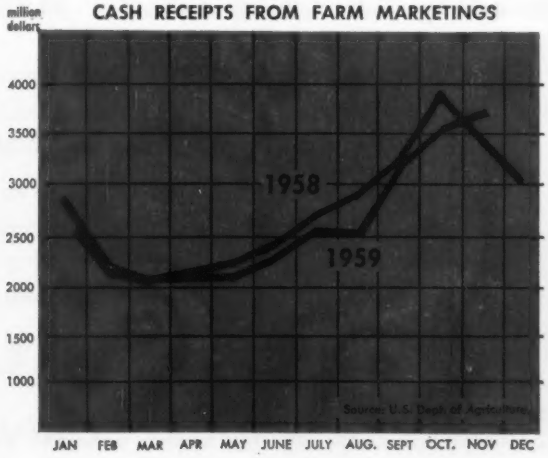
WEEKLY BUSINESS INDICATORS	*Latest Week*	*Preceding Week*	*Year Ago*
Chemical Week output index (1947-1949=100)	218.3	218.0	201.2
Chemical Week wholesale price index (1947=100)	111.4	111.5	112.0
Stock price index (12 firms, Standard & Poor's)	52.26	54.31	53.57
Steel ingot output (thousand tons)	2,647	2,645	2,604
Electric power (million kilowatt-hours)	14,262	14,092	12,945
Crude oil and condensate (daily av., thousand bbls.)	7,153	7,318	7,213

FOREIGN TRADE INDICATORS (million dollars)	EXPORTS			IMPORTS		
	Latest Month	*Preceding Month*	*Year Ago*	*Latest Month*	*Preceding Month*	*Year Ago*
Chemicals, total	152.4	109.9	113.5	34.1	25.6	25.4
Coal-tar products	13.1	7.3	7.7	7.4	4.1	4.3
Industrial chemicals	29.5	19.4	18.0	10.7	9.5	9.1
Medicinals and pharmaceuticals	25.2	21.6	23.7	2.1	2.1	1.5
Fertilizers and materials	12.4	7.1	8.7	11.4	7.2	8.0
Vegetable oils and fat (inedible)	6.4	9.7	4.3	7.2	7.3	7.0

CHEMICAL CUSTOMERS CLOSE-UP

MANUFACTURERS' SALES OF PLASTICS

CASH RECEIPTS FROM FARM MARKETINGS



Sealed-in freshness! Escon polypropylene, brilliant see-through wrapping, helps seal in freshness thanks to its low moisture vapor transmission. Its excellent handling qualities make it ideal for high-speed packaging.

Long shelf life! When used as an overwrap, Escon contributes to long shelf life of candy, cookies, cigarettes and other semi-perishable products. Its brilliant transparency adds eye-and-buy appeal.

Good show! Escon clear packaging film shows the product at its natural best. Since it can be color printed on either or both sides, Escon provides an opportunity for attractive packaging design of many items.

Heat resistance! Escon-packaged gauze pads and other medical dressings can be sterilized by autoclaving. Can Escon's high heat resistance give you the opportunity to add "sterile" to your product label?

Escon* POLYPROPYLENE HELPS ADD

Escon film can give your product maximum sales appeal. And no wonder – Escon makes a packaging film of extreme clarity, uniform quality and high surface gloss.

Escon can be extruded into flat film using either the water bath or chill roll technique. It offers the packaging engineer many advantages including good vapor barrier properties plus greater heat resistance than any other polyolefin.

ENJAY
PLASTICS

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ENJAY COMPANY, INC., *15 West 51st Street, New York 19, N. Y.*

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Escon clear film can be color printed—and reverse printing adds sparkle to the package. Escon also exhibits a wide heat sealing range that allows the packager to vary the degree of seal from a light "tack" to a strong weld.

The modern technical service laboratories of the Enjay Company can help you produce attractive packaging through efficient use of Escon polypropylene. *Trademark

THROUGH PETRO-CHEMISTRY

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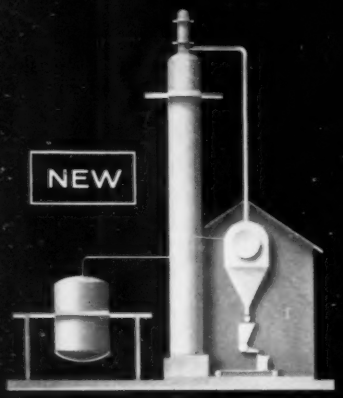
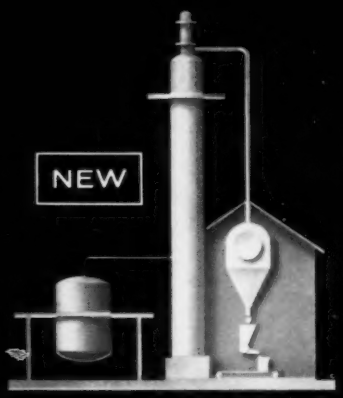
For technical assistance or to order Escon, contact the Enjay office nearest you.

ENJAY
PLASTICS

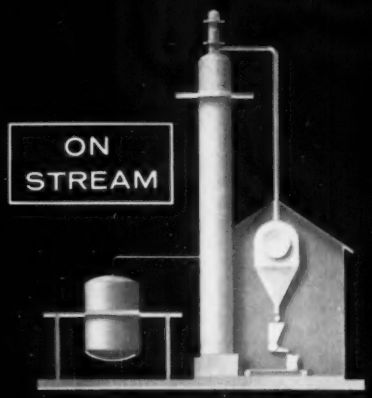
10 SD plants in 5 countries will produce 130,000,000 lbs. of maleic anhydride — more than half the world's capacity



HEYDEN NEWPORT CHEMICAL CORPORATION
Fords, New Jersey



EUROPEAN PLANT



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- **guaranteed operability**

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